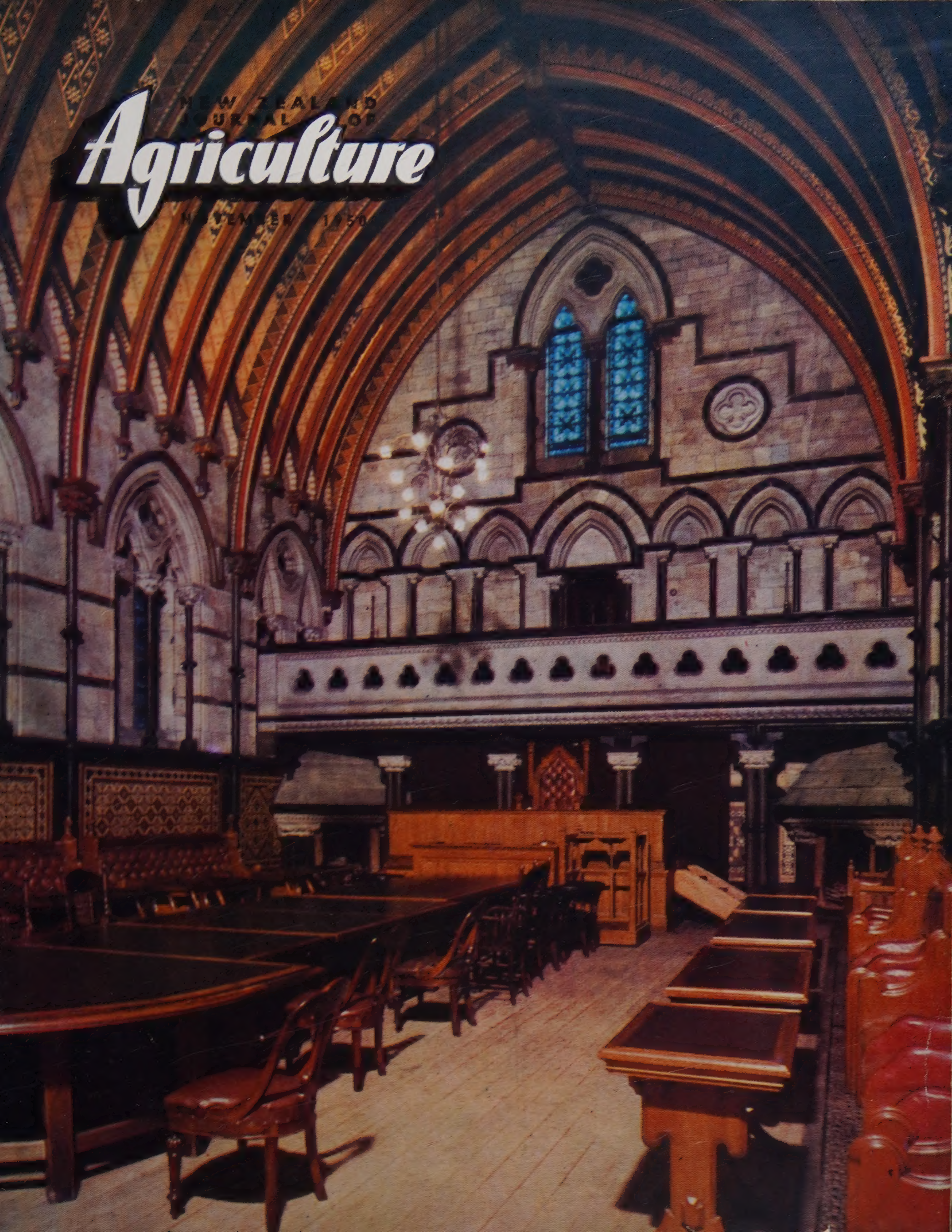
NEW ZEALAND
JOURNAL OF
Agriculture
NOVEMBER 1950



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Volume 81
Number 5
November 15,
1950.
(Established 1910)

NEW ZEALAND JOURNAL OF
Agriculture

Published by
Direction
of
Hon. K. J. Holyoake,
Minister of Agriculture.

This month's cover

Agriculture

Though it is 74 years since Canterbury was governed by its Provincial Council, the Provincial Buildings remain a landmark of Christchurch. This month's cover, which has been reproduced from a natural-colour photograph by Sparrow Industrial Pictures Ltd., shows the impressive interior of the council chamber of the Provincial Council Buildings, which are in Gothic style. They were designed by Benjamin Mountfort, Provincial Architect, who came to New Zealand in 1850. In Canterbury, which is now celebrating its centennial, farming developed rapidly from the earliest days of settlement and the province has always been the main cereal-producing district of New Zealand.

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The "Journal" is issued monthly. The subscription within New Zealand is 2s. 6d. a year; the overseas subscription is 5s. The "Journal" may be ordered from any bookseller or newsagent, or direct from any office of the Department of Agriculture. Individual copies are available from Publications Section, P.O. Box 3004, Wellington, at 3d. a copy, post free.

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All correspondence relating to the "Journal" should be addressed to the Editor, "The New Zealand Journal of Agriculture," P.O. Box 3004, Wellington.

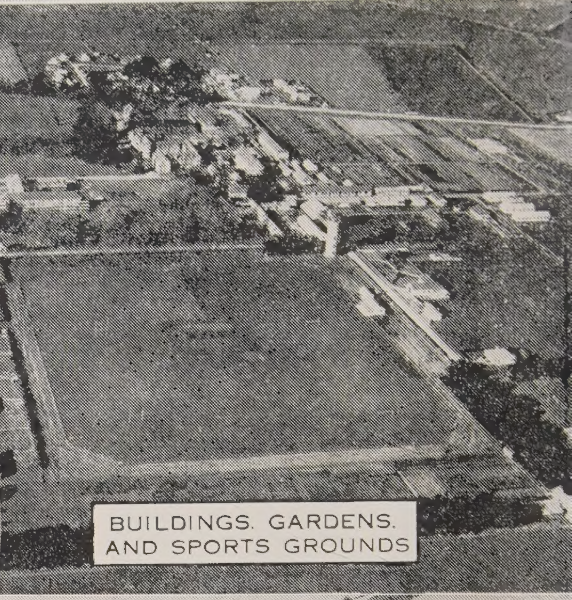
Subscription inquiries (preferably accompanied by the address cut from a recent "Journal" envelope) should be sent to the nearest office of the Department of Agriculture.

REGISTERED AT THE G.P.O., WELLINGTON, AS A MAGAZINE.

24 JAN 1951

CANTERBURY AGRICULTURAL COLLEGE, LINCOLN

BUDDING FRUIT TREES


BUILDINGS. GARDENS. AND SPORTS GROUNDS

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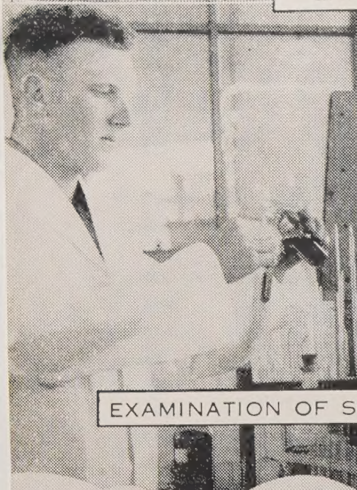
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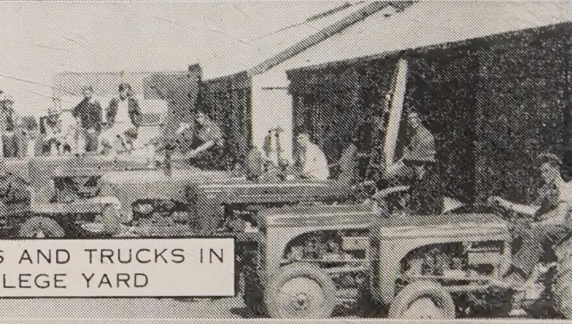
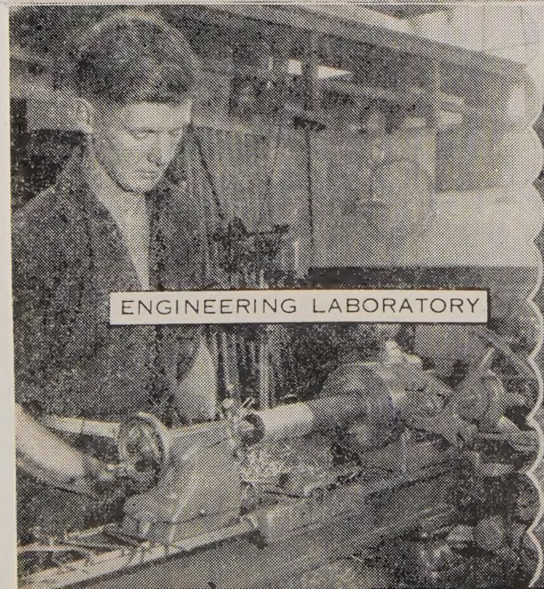
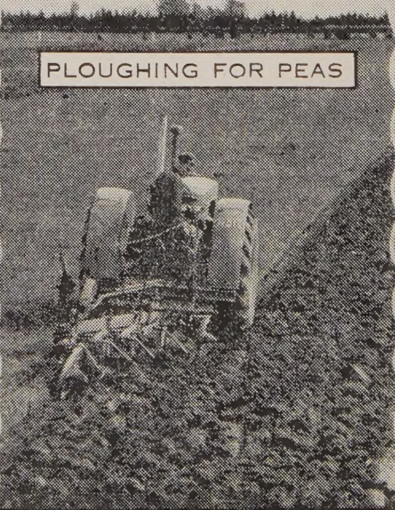

TRACTORS AND TRUCKS IN COLLEGE YARD

TEAM RETURNING FROM WORK

Opened in July, 1880, Lincoln College provides diploma courses in agriculture, horticulture, and valuation and farm management and degree courses in agriculture and horticulture. On the college farm of 1264 acres and the Ashley Dene farm of 878 acres, a wide variety of crops and pastures is grown and many breeds of sheep, cattle, and pigs maintained. Research into agricultural problems has always been a major activity. Probably the most important work of the college in 70 years of service to farming has been the teaching and fostering of good husbandry.

[Aerial photograph by V. C. Browne.


ENGINEERING LABORATORY


PLOUGHING FOR PEAS

SETTING A PLOUGH

A Century of Canterbury Farming

WHILE we celebrate the Centenary of Canterbury in the City of Christchurch and the larger towns of the province, it would be well to cast our thoughts from time to time across the wide plains, to the rolling foothills, into the mountain-locked river basins, and indeed into the alpine fastnesses themselves where are the roots of much of our history.

Many of those who toiled with their worldly goods up the hills behind Port Cooper must have paused at the summit to surmise where in the vast panorama of Canterbury stretching on all sides their future was to lie. The spread of this nucleus of first settlers and subsequent immigrants from the Home countries and Australia across the tussock plains and into the rich grazing lands of the hinterland wrote the first pages of a farming tradition that is a most important chapter in the province's history.

It is fitting that in a series of articles the first of which appears in this issue, "The Journal of Agriculture" should record in brief form the evolution of farming in Canterbury in the past 100 years. It is a fascinating story of adaptation, much success, some failure, great endeavour, great tribulation. In this end-of-century stocktaking the result should be estimated with due regard for the noble aspirations of the first settlement plans, the difficulties facing the transplanting of an Old World society into the rigours of colonial life, and the tremendous impact of mechanisation, greatly improved transport and communications, artificial fertilisers, and rapidly expanding agricultural knowledge.

The Canterbury A. and P. Association's Centennial Show in the past week was a magnificent exhibition of the best products of the great primary production industry that has been built up in the province. Names of some exhibitors and of mercantile firms that have supported the association over the years are as much a part of our history as those of topographical features. In the farmers' shop window of the show could be read some of the story of Canterbury lamb, prototype of the highest quality on the London market, of the "bonanza" wheat farms of the plains, and of the great sheep flocks rapidly bred up in the pastoral age of the province. In the show ring the finest products of our livestock breeders were paraded.

The Future

As we pause to pay tribute to those who laid the foundation and moulded our way of life in the past 100 years, the vista of a second century opens before us. We often talk about the progress New Zealand has made, but too often we are prone to forget the factors that have led to that progress, and so I wish to take this opportunity of stressing the fact that our progress is largely due to the genius of the New Zealand farmer in both pasture and stock management. Especially is this so in Canterbury. Grasslands are the basis of our economy, but when we can produce our splendid flocks and herds and raise the stock-carrying capacity with our meagre rainfall we have much to thank the farmers for.

[*National Publicity Studios photo.*

In the development of irrigation there are great potentialities for increased production and a changed pattern of farming in the drier areas of the province. All aspects of farming under irrigation are being investigated at the Department of Agriculture's Irrigation Research Station at Winchmore. Exploitation of the great water resources of our rivers and practical application of knowledge acquired at the station may well effect remarkable increases in our production potential.

Pastoral wealth of the tussock country that was at one time squandered by overgrazing and burning must be restored through revegetation and wise management. Much of the land is Crown leasehold and the Crown is already engaged in regenerating large areas of deteriorated tussock land on the northern borders of the province. It is certain that wiser land use could improve stock-carrying capacity. We must become more conscious of the reproach of our marginal lands and apply ourselves vigorously to their development.

The calibre of our agricultural research workers is second to none and the provision of extension services to farmers in this country is most generous. If in our short history successes are fresh in our memories, mistakes should be equally so. Let us not repeat errors that have cost us dear in loss of fertility and production. There is no more precious heritage than the land. With 100 years of experience and an ever-increasing accumulation of practical and scientific agricultural knowledge to aid us, we should face a second century of trusteeship of the land with confidence.

S. G. HOLLAND, Prime Minister.

CARE OF LIVESTOCK DURING DECEMBER

Contributed by the Animal Research Division.

CARE OF EWES AND FAT LAMBS

As each lot of lambs is sold, draft off their mothers together with any dry ewes which may remain in the flock. If feed is short and the ewes have very little milk, it usually pays to wean all the lambs, which can then be given the best grazing available. The ewes should be shorn and those which are to be retained should be placed on short pasture with ample water. This will help to reduce their condition and will result in a better lamb percentage in the following season.

* * *

SHEARING

If ewes with lambs are to be shorn, every effort must be made to reduce the time during which lambs are away from the ewes, as it is easy to dry off ewes at this time of the year. The ewes should be brought to the shed in small mobs and should be dagged before reaching the board.

* * *

FOOT-ROT CAN BE ERADICATED

Farmers who wish to eradicate foot-rot from their flocks should obtain the Department of Agriculture Bulletin No. 325. This is the season in which the eradication campaign must be planned.

PIG FEEDING

Sows should be brought into the house a week or two before farrowing, and fed up to 6 gallons of milk per day, but this should be reduced to 2 gallons plus bran if available on the date on which they are due. Watch for signs of constipation in heavy in-pig sows. Baconers from spring litters should be sold as sow feed requirements increase, as it is important not to starve the sows and litters. These sows require 6 gallons of milk plus an additional gallon for each pig in the litter. Meal may replace part of this ration at the rate of 1lb. of meal for every gallon of milk. Orders for meal supplies for next spring should now be placed with the merchants.

* * *

COWS RETURNING TO THE BULL

If cows are returning to service, examine the mating records to see if any particular bull is to blame. If so, get a Veterinarian or Stock Inspector to collect a semen sample for examination. Be careful in purchasing replacement bulls. If possible, buy a young bull that has not been used previously. Never buy a bull in the saleyards unless his full history is known. Washing out cows seldom helps and may cause trouble if irritant fluids such as kerosene are used. It often pays to consult a Veterinarian as soon as the cows are noticed returning to service in unusual numbers, as the Veterinarian cannot be expected to diagnose the trouble months later.

* * *

FOWL POX

So-called roup is often fowl pox. Send specimens to the Animal Research Station, Wallaceville, for diagnosis. Outbreaks of this disease can be prevented by vaccination, full details of which may be obtained from the nearest Poultry Instructor, Department of Agriculture.

* * *

ZINC POISONING IN PIGS

The zinc lining of new galvanised pipes may be dissolved by the flow through them of dairy by-products, and these then prove poisonous when fed to pigs. Consult the nearest Veterinarian before making a new installation.

* * *

DAIRY-COW NUTRITION

The year's production can be materially affected by feed conditions during summer. Cows fed poorly now not only produce less milk during the summer but will dry off earlier in the autumn. Dairy statistics show that long lactation is very important, so start feeding silage or other supplementary milk-producing fodders as soon as pasture starts to dry off. Do not wait for milk production to show a material fall.

Farming in Canterbury

NEW ZEALAND owes a great debt to Canterbury's pioneer farmers and pastoralists, who, perhaps more than any others, successfully adapted English and Australian experience to the new environment and established a firm tradition of careful cultivation and management. Despite its late start, Canterbury was by 1860 the premier agricultural and pastoral province in New Zealand, a position maintained for many years. Experienced men have gone from Canterbury to the North Island and have successfully adapted themselves and their methods to help in its development. Today New Zealand is peculiarly dependent on Canterbury in other ways. Not only does the province produce most of the cereals consumed, but produces most of the high-quality grass seed which is the basis of New Zealand's grassland farming. With the Canterbury Centennial now being celebrated, a survey of the progress of farming in Canterbury over the past 100 years is opportune. This article is the first of a series which traces the history of farming in Canterbury and discusses the influence of that farming on agriculture in other parts of New Zealand.

[Whites Aviation Ltd. photo.

IN this series the development of Canterbury's farming has been divided into four periods, each of which is treated in a separate article. This article deals with the first period, 1850-1880, and describes the initial settlements and the partial occupation and concludes with an account of the more intensive development of land and public works during the 1870's. The second article, which will appear in next month's "Journal", will discuss the next period, from 1880 to 1900, the salient features of which are the fortunes of the wheat industry, the development of refrigeration, and the cutting up of larger estates for closer settlement. The third article, which will be published in the January issue, will describe the period 1900-1920 and will deal with the continued development of the frozen-meat industry and the effects on farm management which it brought about; the progress of closer settlement; the effects of war; and the beginning of farm mechanisation. The final article, to appear in the February issue, will bring the story of Canterbury's farms up to the present day and will discuss the impact of depression and war; the effects of changing patterns of farm management; the effect of mechanisation; the development of minor industries such as fruit and vegetables and poultry; improvements in farm amenities; and the changing structure of Canterbury's population.

Throughout this series it is intended to deal with the area included in the Canterbury Land District and not with the provincial district alone. The counties of Amuri and Cheviot were always economically allied to Christchurch, even if a historical accident led to their being annexed by Nelson. Practically uninhabited before 1864, Westland was included in Canterbury from 1864 to 1867, when it was created a county with administrative but not legislative power. Westland Province had a brief existence, from 1873 to 1876.

These articles are based on notes supplied by officers of the Extension Division and have been compiled by P. R. Stephens, Assistant Investigating Officer, Department of Agriculture, Wellington.

NEW ZEALAND IN 1850

In 1850 most New Zealand settlements had been established for 10 years and the settlers were slowly beginning to adapt themselves to the new unfamiliar environment. The enthusiasm of the initial stages had been damped, the hopes of easily gained wealth and security had been abandoned, but the settlers were beginning to see what the future would hold in store for them and were prepared to set about achieving their more modest goals. Each settlement drew upon the experiences of its predecessor, and if one reason for Canterbury's success was the more favourable environment, another was the lessons that had been learnt from the earlier settlements.

By 1850 there were ten scattered settlements from one end of New Zealand to the other, with a number of smaller ones little more than mission or whaling stations. These settlements had grown up separately, had little direct communication with one another, and were strongly parochial in outlook. Auckland was the largest, having a population of 8300, and was followed by Wellington with about 5500, Nelson with about 4000, Otago with 1500, and New Plymouth with 1400; the Banks Peninsula settlements immediately before the arrival of the Pilgrims contained about 250 people.

Large-scale Sheep Farming

In the first settlements little thought was given to what the newly established farmers would produce, farming on the English model being out of the question, but by 1850 a way out of this impasse was becoming apparent. Large-scale sheep farming, which had proved so profitable in Australia, was being pioneered in New Zealand, and on the agricultural land near the settlements a class of small farmers was replacing the imitation squires. These small agricultural settlements formed an indispensable base from which the later pastoralists could begin their operations.

SETTLEMENT OF CANTERBURY . . .

All the writers of the period enjoined simplicity and hard work on the emigrant to New Zealand. In a handbook published in 1848 it was stated: "Let the emigrant bear in mind that the mere possession of a formidable array of agricultural implements is not agriculture, but the industrious use of the spade and mattock is." The most successful wielders of the spade and mattock were the small farmers who had come out as labourers. The farming practised by these small cultivators was designed to meet local needs alone, with the result that time and energy were spent in many districts in producing crops which were not entirely suited to the local soil and climate. But until a more satisfactory division of labour could be found no other course was possible.

Areas of Settlement

The settlements fell into six well-defined areas—North Auckland, Auckland, Wellington (with its offshoots at Wanganui and New Plymouth), Nelson, Akaroa, and Otago. Auckland, in spite of the advantages of being the capital, suffered from a shortage of readily available land, perhaps a lack of sufficient attention to farming, and land speculation. The New Zealand Company's settlements, Wellington, Nelson, New Plymouth, and Wanganui, faced similar difficulties and endeavoured to overcome them in much the same way. Disputes with the Maoris, disputes with the Government, excessive amounts of land sold to absentees, and general disillusionment were common to all, but by 1850 the beginning of extensive pastoral farming in the Wairarapa, Hawkes Bay, and on the Wairau Plains was giving them some economic stability. Otago's progress was also very slow at first, but it, too, progressed rapidly when the interior was opened up.

In character the settlements were vastly different, ranging from Auckland, with no formal schemes of emigration and land settlement and attracting mainly those who hoped to profit by being first in the field, to Otago, where it was hoped to maintain a rigid system, with every immigrant selected not only for his industry and adaptability but because he held particular religious beliefs. The company's settlements at Wellington and Nelson occupied an intermediate stage, adhering to a definite land settlement policy, but not making any stipulations about the religion or morals of their immigrants.

The Canterbury Association demanded membership of the Church of England as well as a good character of prospective immigrants but beside the careful selection of immigrants the Canterbury settlement had the advantage of more careful preparation. The land was adequately surveyed, some attempt had been made to house the immigrants on their arrival, and the settlement was vigorously led. At no stage were there any fears for its survival.

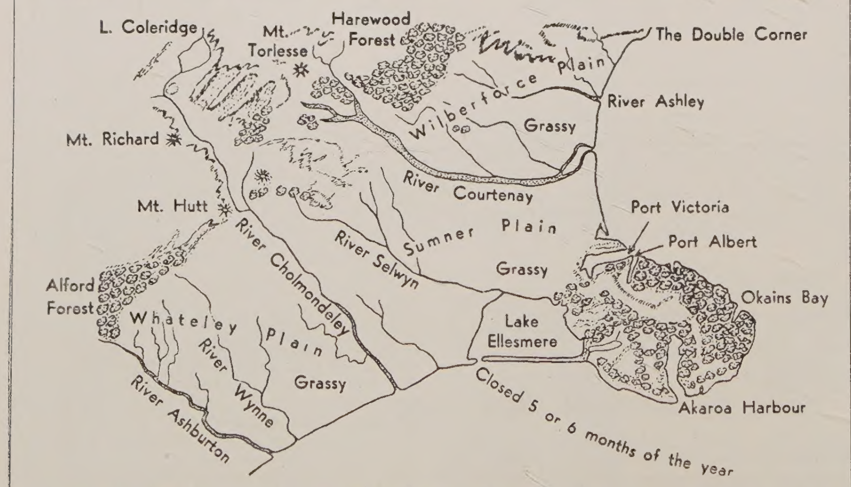
FOUNDING OF CANTERBURY

For the antecedents of the Canterbury settlement one must look first at the state of British society in the first half of the 19th century. The Industrial Revolution in the late 18th and early part of the 19th centuries changed Britain from a predominantly agricultural community to the urban one that it is today. During the 40's of last century the transition had reached its most painful stage, with new inventions enabling machine production to spread into fresh fields, railways revolutionising transport, and yet the accumulation of wealth seeming to benefit relatively few. Emigration became more than a vague possibility; it was an urgent necessity and, though the majority of emigrants between 1845 and 1855 went to America, large numbers went to the British colonies.

Wakefield's Land Scheme

Edward Gibbon Wakefield's scheme for the sale of land at a high and sufficient price assisted emigration, and the granting of some form of self-government was proposed at a time when the Government regarded colonies more as a burden than an asset. Wakefield felt that the abundance of cheap land caused the working class to withdraw themselves from the labour market, and his high price was designed to prevent this. The emigration of "young marriageable persons" of both sexes would give some stability to new settlements, make colonial society more attractive, and also help to solve the problem of the redundant population in Britain.

Edward Gibbon Wakefield, photographed shortly before his death in Wellington in 1862 at the age of 66. The original photograph, which was taken by one of Wellington's earliest photographers, was used by Joseph Durham, R.A., as a model for the bust in the Colonial Office, a replica of which is in Parliament Buildings. A copy of the photograph is in the possession of the Wellington Public Library.



A map showing the site of the Canterbury settlement which was published in the "Canterbury Papers" before settlement had begun. The estimated extent of plain land was 1,765,000 acres, wood land 237,100 acres, and mountain and hill land 397,900 acres, a total of 2,400,000 acres.

He first publicly announced his interest in New Zealand in 1836 when giving evidence before a House of Lords Select Committee on the Disposal of Waste Land in the Colonies, as he then declared, "We are, I think, going to colonise New Zealand, though we be doing so in a most slovenly, scrambling and disgraceful fashion", and soon after, in June, 1837, the New Zealand Association was formed to induce the Government to assist in the colonisation of New Zealand and make some moves toward annexation. Viewed with suspicion by the Colonial Office, the association, and later the New Zealand Company, was involved in a long conflict with the Government, but finally forced its hand by dispatching the Tory to Port Nicholson in 1839, the main body of colonists leaving a few months later.

Plans for a Church Settlement

After the founding of Wellington Wakefield was engrossed for some time in Canadian affairs, but he had already conceived the idea of a church settlement in New Zealand, the church to provide a unifying force which had been lacking hitherto, and in the New Zealand Company's report for 1843 it was stated: "It is proposed that the plan of the other colony shall contain a scheme of large endowments for religious and educational purposes in connection with the Church of England. As it is intended that this colony shall be on a larger scale than any hitherto adopted by the Company, the plan of it will not be ripe for publication until next year." But the depressed state of the existing colonies, the parlous condition of the New Zealand Company's finances, and the Wairau massacre reduced the enthusiasm for colonisation in New Zealand. The Otago scheme was also making very slow progress.

The open, tussock-covered South Island did not attract the attention of prospective colonists as early as did the North, settlements around Banks Peninsula beginning, as in most places in the South Island, with the establishment of shore whaling stations. Akaroa was frequently visited by whalers in the 1830's and in 1837 William Hempleman established a station at Peraki, on the south coast of the peninsula. According to his own statement, which is supported by fairly strong evidence, he purchased the whole of the peninsula from the more influential Maori chiefs in 1837. William Barnard Rhodes, another whaler bought a large area of land from the Maoris at Akaroa in 1839 and after bringing some cattle from Australia, installed William Green as his manager in November, 1839. These cattle were not allowed to be sold, but simply allowed to increase as quickly as possible, despite the pressing needs of the first colonists. Eventually, in 1843, the first cow was sold for £43, and such was the beginning of dairy farming in Akaroa.

Arrival of French Settlers

From 1837 onward numbers of French whalers had visited Banks Peninsula, and in 1838 Captain Langlois, of the whaler Cachelot, made an arrangement to purchase the whole of Banks Peninsula. On his return to France Langlois sold this right to the newly formed Nanto Bordelaise Company, which early in 1840 dispatched the Compte de Paris with 59 French and 6 German settlers. These arrived at Akaroa soon after British sovereignty had been proclaimed.

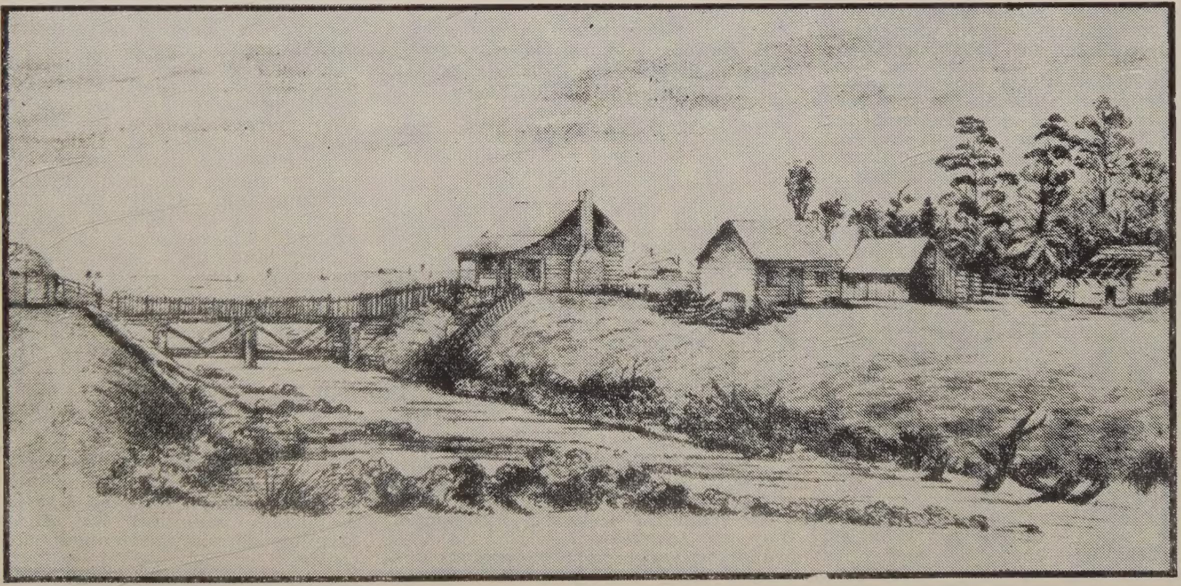
The French settlers did not go far afield, but devoted their time to cultivating the 5-acre blocks to which they were entitled and trying to utilise the large variety of seeds and vines which they had brought with them; the Germans, wishing to live together, moved further up the harbour to a spot known to this day as German Bay. At the end of the first year the immigrants had not procured any stock, but were living on preserved and salt meats with what vegetables they could get from their gardens. There was no grain grown the first year or two, and the colonists were dependent on supplies from outside sources, their lack of capital being a severe handicap.

The first attempt at cultivation in the plains was made by James Herriot, representing a Sydney firm, who selected some land near the present site of Riccarton to grow wheat. The bankruptcy of the Sydney firm compelled his withdrawal, but one McKinnon endeavoured to carry on until March, 1841, when he returned to Akaroa. William Deans, who had become dissatisfied with the prospects of Wellington, secured permission from the Governor to squat (to occupy land without a title) on the Canterbury Plains, and with his farm workers, Gebbie and Manson, he moved to Port Cooper in the schooner Richmond and, after exploring the upper reaches of the Avon, finally settled at Riccarton near the site of Herriot's earlier venture. Shortly after John Deans brought stock from Australia. During 1843 the Richmond made two more voyages from Wellington, bringing the Sinclairs and Hays to Pigeon Bay and the Greenwood brothers to Purau.

Importance of Cows

By 1844 these families were reasonably settled, almost completely self-sufficient farming communities. The Hays had 18 cattle running loose in the bush, including 9 cows, which gave them about 25lb. of butter a week. All through the 1840's they "grew wheat, cut it with a reaping hook, threshed it with a flail, and ground it at night or on a wet day". Gebbie and Manson were dairy farmers and what produce could not be sold to the whalers on the peninsula was forwarded to Wellington by coastal schooner. Cows were indeed the mainstay of all the early settlers.

After the Deans brothers had built the first house on the plains John Deans sailed for New South Wales and returned with 61 head of cattle, 3 mares, 43 sheep, seed wheat, seed oats and barley, lucerne seed, and potatoes. After much trouble all the animals and supplies were landed at Riccarton, and work was started on farming and clearing. The river was bridged, several fields were fenced and cultivated, orchards were established, and a small plantation was begun. In 1843-44 they grew their first grain crops, which consisted of 2½ acres of wheat, 1 acre of oats, and 2½ acres of barley, but as the seed was sown too late, the crops were light. However, the following season the wheat crop of 26 acres, which followed a crop of



[From the Alexander Turnbull Library photographic collection.

The Deans farm at Riccarton. The first building was completed in 1843 and the others 2 years later. This sketch was made by the surveyor M. T. Cridland shortly before the arrival of the Pilgrims in 1850.

potatoes, yielded between 60 and 70 bushels per acre. Subsequently more seeds, livestock, fruit trees, and implements were bought on trips to Sydney.

Interest on the part of the New Zealand Company in the Canterbury Plains was aroused as early as 1841, when Colonel Wakefield dispatched Captain Daniell and George Duppa to inspect the country around Port Cooper, and in 1844, Frederick Tuckett made a brief survey of the plains for the promoters of the New Edinburgh settlement, finally deciding that they were suitable only for pastoral purposes and not for a compact agricultural settlement, which the New Edinburgh promoters envisaged.

Shortly after his first meeting with John Robert Godley, who had already displayed a keen interest in emigration, Wakefield began detailed discussions with him on the subject of the Canterbury settlement. At the beginning of 1848 Godley formed a committee of management, which in March of that year issued a plan of the Canterbury Association and a list of the members. The association, a board of trustees rather than a company, took an option of purchase over 300,000 acres held by the company.

High Price of Land

The land taken over by the association was to be sold to selected immigrants for the unusually high price of £3 per acre, of which one-sixth (10s.) was to be paid to the New Zealand Company, one-sixth was to be devoted to surveying and public works, one-third was to be devoted to religious and educational endowments, and one-third to financing the emigrant fund. Some 1000 acres were to be reserved for the capital city, in which public reserves were marked out, and 1000 acres for suburban land alongside. Rural land was not to be sold in lots of less than 50 acres, and exclusive rights of pasturage over unoccupied land were to go to land purchasers.

The first task of the association was the selection of a site on the land held by the company in New Zealand, and in July, 1848, Captain Thomas was sent out to make a decision in consultation with the Governor and the Bishop of New Zealand. The Governor suggested the Manawatu and the Wairarapa, but Thomas himself preferred Port Cooper, and he was strengthened in his opinion by the success of the Deans brothers in farming the plains. The Deans farm had already been favourably reported on to Colonel Wakefield, but the deciding factor was the Deans Report on the Condition of the Plains, which was a reply to a number of queries of Captain Thomas. Although the Deanses had at the time been only 6 years in Canterbury, they had acquired a thorough knowledge of the methods required on the plains, and their letters can be regarded as a brief guide to farming. They described the weather, suitable crops, the breaking in of land, and the stock and farm implements most suitable. They considered the land most fertile, wheat crops of more than 60 bushels per acre having been obtained, and that no part of the plains should be difficult to break in at reasonable cost. Fine-woolled sheep from Australia were felt to be most suitable for stocking the country, but it was considered that Durham and Galloway cattle should be brought from England.

Agreement with N.Z. Company

The association finally obtained a charter from the Government and concluded an agreement with the New Zealand Company, giving it an option over 2,500,000 acres of land for 10 years, though the surrender of the New Zealand Company's charter and the tardy response of the land buyers handicapped the association for some time. With the departure of the Randolph, Charlotte Jane, and Cressy from Plymouth on September 7, 1850, and the Sir George Seymour the following day the first phase in the settlement of Canterbury was completed.

[*From the Alexander Turnbull Library photographic collection.*

John Robert Godley, founder of Canterbury. Though he spent only 3 years in Canterbury from April, 1850, to December, 1852, his sound administration enabled the settlement to be established on a firm basis.

INITIAL SETTLEMENT

Reactions of the settlers to their first view of the plains varied greatly, their hopes and fears being often both confirmed. The featureless landscape seemed to have struck everyone, and the small areas of cultivation around Christchurch in later years seemed only to accentuate it.

At the beginning of 1851 the first land purchasers among the Pilgrims took over their estates, practically all of which were in the immediate vicinity of Christchurch. Most of them comprised a modest 50 or 100 acres, and with the limited number of horses and bullocks available, nearly all hired from the Deanses at Riccarton, they set to work to cultivate their properties and supply themselves with wheat, oats, and potatoes. Though much of the land was covered in flax and toi-toi and was rather swampy, the Pilgrims did not have the back-breaking work of clearing the bush that their predecessors in the North Island had to face. They were able to break in the land as soon as sufficient horses and bullocks were available, and in the second year of settlement there were 500 acres of wheat sown within a short radius of Christchurch.

In 1853 W. G. Brittain, the Land Commissioner, gave some details of a crop which he grew near the present Barbadoes Street bridge: "I had thirteen acres laid down in wheat. The land, which was originally covered in tutu, fern and grass, had been broken up the previous year, and had borne a first crop, partly of wheat and partly of potatoes. The land was ploughed about the latter end of March, and remained fallow until the last week in May, when, having been lightly harrowed, it was sown with wheat broadcast with two bushels to the acre. The soil being very light, the plough followed the sower and covered the seed to a depth of about three inches. In the spring when the young wheat was about two inches above ground it was well rolled with a heavy horse roller. The crop threshed at seventy bushels to the acre."

Scarcity of Labour

In the first years of settlement the landowners did not have to exert themselves unduly, as there were sufficient labourers to do the heavy work. But the labourers were not particularly happy with this state of affairs and endeavoured where they could to jump the hurdle of the Wakefield land price or moved off to the recently discovered Australian goldfields. The "Canterbury Almanac" (1854), lamenting this situation declared, "During the early part of the year some of the labouring class, tempted by the goldfields, emigrated to Australia. . . . The consequence was that a scarcity of labour began to be sensibly felt and capital was chiefly invested in flocks and herds, while all tendency to refinement was genuinely checked by the want of leisure from manual work."

From the opening up of the country for pastoral runs from 1852 to the discovery of gold in Otago in 1861 agricultural farming remained very much of secondary importance, the local market being so limited and the profits both immediate and prospective from sheep so much greater that all but the stolid and unenterprising took to squatting. Cultivation was confined during the 1850's to limited areas around Christchurch and Kaiapoi, though the total area under crop, including sown grasses, rose from 802 acres in 1851 to 13,900 in 1858, which included 4200 acres of wheat, 2500 acres of oats, and 4200 acres in grass.

By 1858 a small export trade in wheat had developed, but at that time the incipient conflict between the squatter and the small farmer was coming to the fore and the squatter was effectively asserting his claims. Wheat prices were fairly high, from 6s. to 7s. a bushel, but primitive transport, inadequate shipping services, and a certain contempt for small-scale farming discouraged much attention to it.

Effects of Gold Discoveries

The effects of the gold discoveries on the Canterbury economy were both immediate and profound, and the first result was a stimulus to agriculture and the raising of fat cattle. Wheat, which was selling at 6s. per bushel in Christchurch in 1861, rose to 8s. 8d. in 1864, oats rose to 5s. 7½d. in 1863, and in the same year beef reached 53s. per hundredweight. Wheat acreages did not rise very much over the 3 years 1861-1864 (from 12,785 acres to 13,328 acres), but during the period of the west coast gold rushes it more than doubled (from 13,328 acres in 1864 to 26,683 acres in 1867). The Maori Wars, too, created a demand in the North Island both as a result of army purchases and the general disruption of farming. Driving cattle to the west coast was a most profitable business, John Grigg of Longbeach being one of the largest suppliers.

During the 1850's agriculture in Canterbury was still in the "man-power" stage, the methods and implements used being simple, with sowing, reaping, and threshing being done by hand as they had been in Europe for centuries. On the Deans farm at Riccarton a "Bell's Improved" reaping machine was introduced in 1856. It was a cumbersome affair pushed by two horses and had been developed in England about 30 years before. Ploughs were a single-furrow swing type, usually a Barrowman or a Grey, and by 1860 there were estimated to be about 250 in Canterbury. Much of the plains must have been broken in by these ploughs pulled by a slow and awkward team of bullocks.

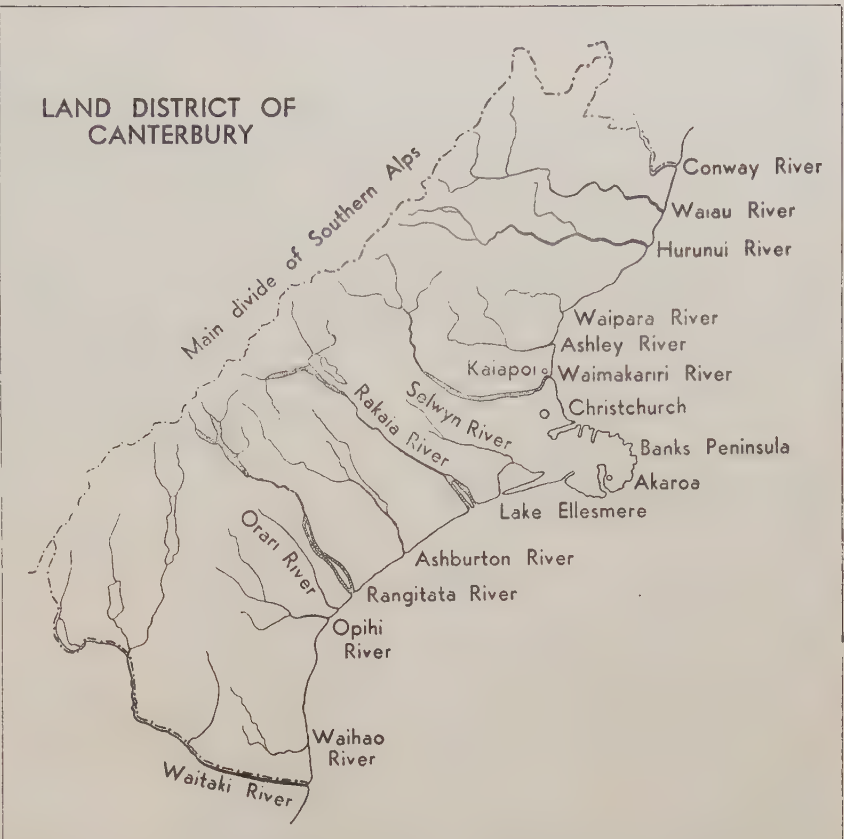
Sowing was usually done by hand, a skilled man being able to cover 25 acres a day. Wheat sown broadcast on well-made furrows and given one stroke of the harrows came up in rows as straight as those made by a drill. A seed drill was first imported into Canterbury in 1853, but drills do not seem to have been popular until an American corn drill was introduced over 20 years later.

Up to 1860, apart from what was done by the Deanses' machine, reaping was done by scythe and sickle; in 1859 a Burgess and Key reaping machine was imported, and at the time it marked a very great advance on the old hand methods, even though the crop still had to be gathered by hand.

Besides the use of the primitive flail, threshing was done by simple horse-driven machines, the horse being driven around a capstan which worked a revolving drum; one of the first of these machines was imported in 1850. In 1865 a 6 h.p. steam engine was imported and started work near Prebbleton, a charge of 9d. per bushel being made for threshing; a steam engine was at work near Kaiapoi about the same time. This was a very marked reduction in current rates and can be taken as the real beginning of mechanisation of farming in Canterbury.

Development of Mechanisation

From 1870 onward mechanisation made rapid progress with the coming into use of double-furrow ploughs, reapers and wire binders, the grain drill, and the traction engine. These innovations, along with the extension of the railways and the bridging of the rivers, made possible the great expansion of wheat growing from 1870 to 1880 which so changed the face of the plains and the style of farming. With the opening of the Lyttelton tunnel in 1867 and the gradual advance of the railway southward, wheat production became more profitable, and about the same time a fall in wool prices discouraged farmers and squatters from leaving their best land any longer in tussocks.



The land district of Canterbury, a roughly rectangular area about 200 miles long and 70 miles wide, occupies the central portion of the east coast of the South Island and extends from the Conway River in the north to the Waitaki River in the south and from the sea in the east to the main divide of the Southern Alps in the west.

Small farmers moved south to around Ashburton and also established themselves around Temuka and Winchester, with a few near Waimate. Sometimes special settlements grew up, such as that of the Irish tunnel workers at Loburn, near Rangiora, who cultivated their modest lots in the manner to which they were accustomed in Ireland and eked out a very frugal existence. But the English and sometimes the Scotch farmers who were taking up land in the plains possessed a much longer tradition of good farming practice, and some of the best-known families in Canterbury farming today first established themselves in the late 1850's and early 1860's.

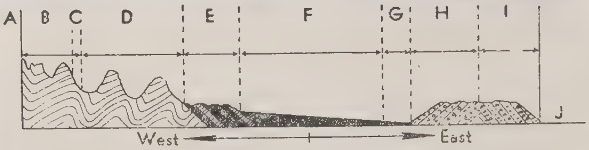
THE SQUATTERS' INVASION

The Canterbury block consisted of 2,500,000 acres lying between the Waipara and Ashburton Rivers and extending back from the sea to the mountain ranges, but up to the arrival of the Pilgrims not very much thought had been given to the manner in which it would be used. Though it was natural for the Pilgrims to purchase lots of rural land close to the organised settlement, they were in fact discouraged from dispersing, for the pasturage regulation provided that 20s. for each 100 acres had to be paid, and in addition the licences over any of this pasturage gave no automatic right of purchase and no security for any improvements which might be effected on the land.

Extension of settlement is referred to as follows in the "Canterbury Almanac" (1854): "Early in the year [1853] some of the newly-arrived colonists from England located themselves on the banks of the rivers Courtenay [Waimakariri] and Cam near the native village of Kaiapoi. This promises to become a position of some importance."

This then was the position for a short period after the arrival of the Pilgrims; a relatively small compact settled area around Christchurch, with a large area of nearly 2,500,000 acres stretching north to the Waipara River and south to the Ashburton River unoccupied except for a few settlers who had taken up land before the Pilgrims' arrival, such as Captain Mitchell of Mt. Grey and the Banks Peninsula settlers comprising the French at

THE TOPOGRAPHY OF CANTERBURY



Ideal section through Canterbury. A—Main divide. B—Alpine region; rock and snow. C—Beech forest. D—High tussock grassland; wool and store stock; extreme temperatures; rainfall 20 to 60in. E—Downlands; mixed farming, with extensive sheep farming on steeper country; rainfall 25 to 35in. F—Plains; mixed farming on better soils; extensive sheep farming on shallow soils; rainfall 25 to 40in. G—Coastal lowlands; high water-table; fertile; mixed farming and dairying; rainfall 25in. H—Banks Peninsula; low effective rainfall; fair pasture; meat and wool; rainfall 25 to 50in. I—Banks Peninsula; good pasture; meat, wool, and dairying; rainfall 25 to 50in. J—Sea.

[Photograph at top left by Whites Aviation Ltd.; others by V. C. Browne.

The district can be divided into (1) the Southern Alps and foothills, (2) the downlands, (3) the plains, and (4) Banks Peninsula.

(1) THE SOUTHERN ALPS AND FOOTHILLS

The rugged mountain chain, with a north-east trend, increases gradually in height southward. Numerous subsidiary ranges, some at right angles and others parallel to the main divide, are separated by deep valleys and broad basins such as the Hanmer basin in the north and the Mackenzie basin in the south. The distance from the main divide to the outer edge of the foothills varies from 30 to 40 miles; thus the high country occupies a large proportion of the area of Canterbury. The soils of the area are derived from the greywacke rock of which the mountains are mainly composed.

(2) THE DOWNLANDS

Practically along the whole length of the foothills there stretches eastward an area of down country which at either end of the district extends to the sea coast. However, in the northern downlands area undulating country alternates with steeper hills. Most of the downlands are composed of a considerable depth of loess underlain by sandstone, limestone, volcanic rocks, and gravels.

(3) THE PLAINS

Between the foothills and ranges to the west, the Pacific Ocean to the east, and the downlands to the north and south lies the almost level expanse of the Canterbury Plains, about 120 miles long and having a maximum width of 40 miles. With a grade of 30 to 45ft. per mile the plains slope gently from almost sea level to about 1000ft. They are traversed by broad shingle rivers.

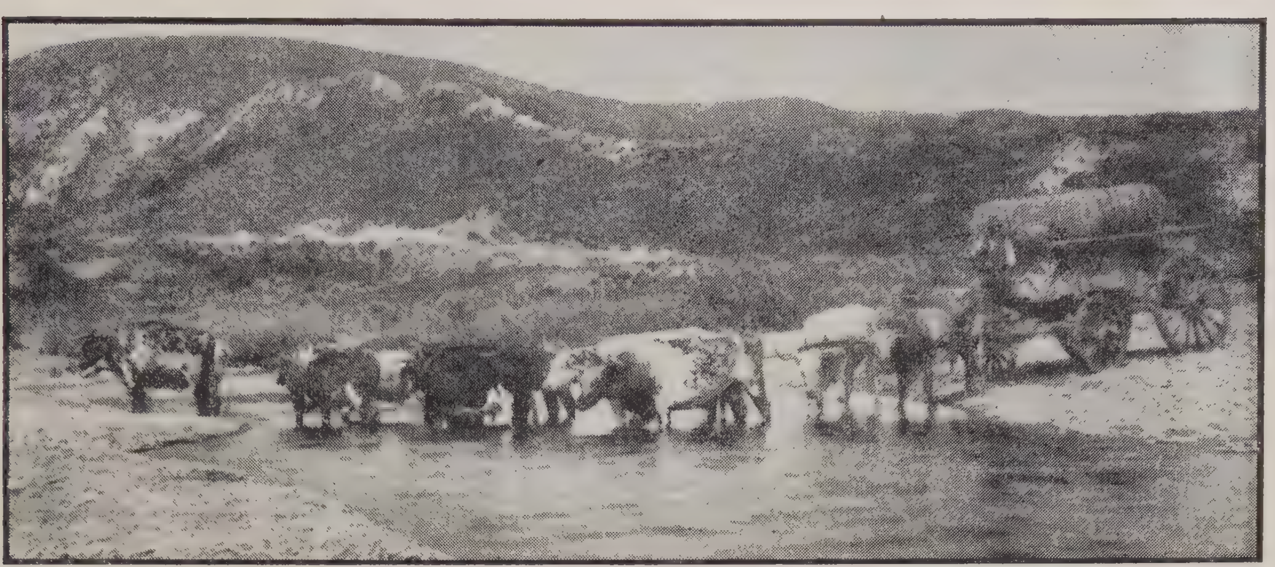
The plains were formed in an era during which the alpine region had a greater elevation and during which glaciation was extensive. The glaciers then occupying the head waters of the major rivers disgorged an immense amount of rock debris eroded from the greywacke mountains into the glacial rivers. This rock debris, composed of gravel, shingle, sands, and silts, was deposited by the rivers in the form of huge fans. The major river fans grew to such proportions that they eventually joined and overlapped one another as they spread eastward. When the land again subsided and the extent of glaciation declined the supply of debris fell away and the rivers began to cut down through the earlier deposits leaving terraces of considerable extent. Most rivers in their upper reaches are now well entrenched between gravel banks, as indicated in the above illustration of the Rakaia River.

The more fertile parts of the plains occur at the outer margins of the great river fans, in the coastal lowlands, in the depressions between the fans, and along the banks of the rivers.

(4) BANKS PENINSULA

Midway between the northern and southern boundaries of the district, Banks Peninsula rises abruptly from the eastern portion of the plains. The present peninsula, with one peak reaching 3000ft., is the remnant of a once larger mass of volcanic rock formed principally by two volcanoes which had their craters in the Akaroa and Lyttelton Harbours. Natural erosion has greatly increased the extent of the interior slopes of the volcanic cones and it has also formed the system of radiating valleys and spurs which occur on the outer slopes. This is shown above in the illustration of Akaroa Harbour and the southern part of the peninsula. The spurs have a relatively easy grade and reach the sea in wave-beaten sea cliffs. The soils of the peninsula are derived mainly from loess.

The loess, the very fine rock flour product of glacial erosion, was swept up from the beds of the glacial rivers of the plains by the north-west winds, and considerable amounts were deposited on the peninsula, particularly on the lower slopes, obliterating in most parts the underlying volcanic soils.

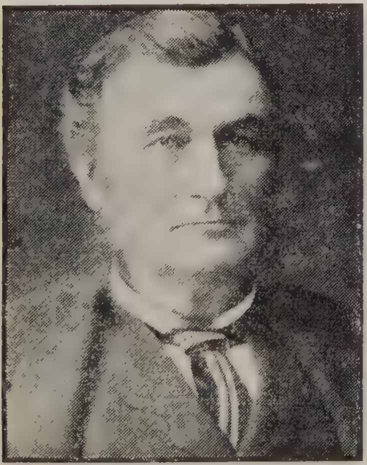


A bullock team on the Cheviot estate in the 1880's. Bullocks were the main motive power during the 1850's and early 1860's, but as metalled roads were formed they were displaced by horses and by 1880 were used only on the back-country stations in Canterbury.

Akaroa, the Hays at Pigeon Bay, and the Rhodes of Purau. Outside the block there were also a few settlers, the Greenwoods at Motunau, Robert Waitt of Teviotdale, and Clifford and Weld at Stonyhurst.

Difficulty of Letting Runs

Godley, the association's agent, foresaw that the settlement could not prosper by resorting to small-scale farming and that it was necessary for the whole of the association block to be taken up as soon as possible. A special committee which he set up to inquire into the problem indicated that the rental for pasturage runs was too great to attract settlers, particularly Australians, who were turning their eyes to the Canterbury Plains. Unfortunately, the recommendation of the committee that the pasturage be let at 10s. per 100 acres could not be implemented, and to make matters worse the Government passed the Crown Lands Ordinance of 1851, which enabled land outside the association block to be taken up in runs with a maximum carrying capacity of 25,000 sheep, and, as 2 acres were allowed for each sheep, the maximum area was thus 50,000 acres. The annual licence fee was £5 for the first 5000 sheep and £1 for every additional 1000 sheep. The licence, which was for 14 years, was to cease if the land was sold by the Crown. Licensees were encouraged to purchase the freehold of a homestead area not exceeding 80 acres, and they were protected for any improvements which they might effect on this.



[From the Alexander Turnbull Library photographic collection.

William Robinson of Cheviot, one of the largest sheep owners in New Zealand. He began building up the Cheviot estate in 1852 and finally acquired 84,000 acres of freehold, his ability to pay cash in all business transactions earning him the name "Ready Money" Robinson.

These conditions were much better than those offered by the association for its waste lands, and consequently Godley was in a dilemma, but he met the position by taking advantage of the provision that the association was not compelled to let land to any but land purchasers. He proposed that if anyone wished to start a run with, say, 1000 sheep, he would let him 1000 acres for the first year and would not let the adjoining 19,000 acres for 7 years. The stockholder had to take further areas in subsequent years, which meant that a lease of 20,000 acres for 7 years might be obtained. Even with this arrangement the runholder would pay more within the block than outside, but he was partly compensated because of being nearer a settlement.

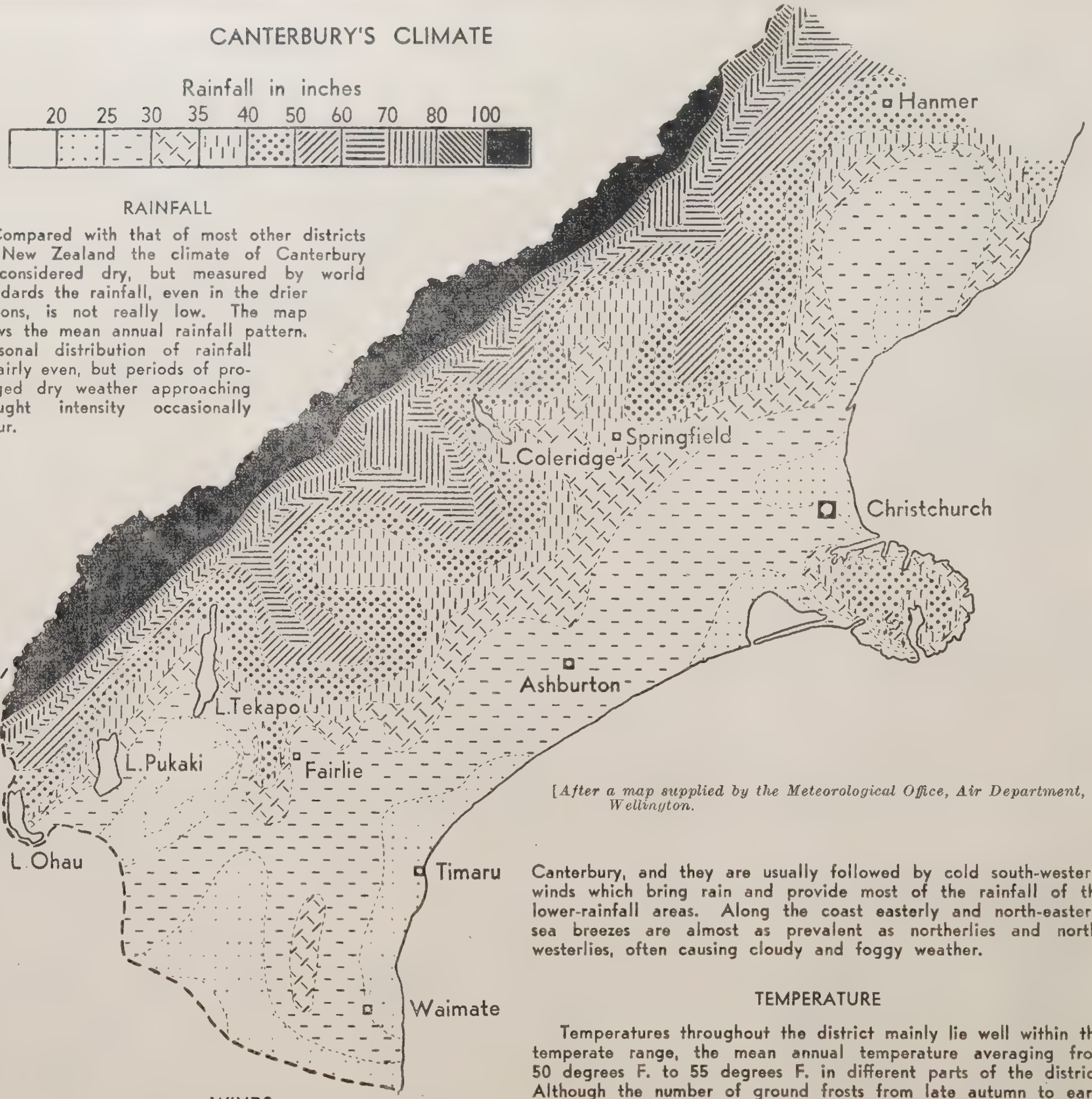
New Phase of Settlement

The stage was now set for a further phase in the settlement of Canterbury; the pre-Adamite phase (settlement before 1850) had passed and the Pilgrim phase was passing, and now eyes were being turned to the open spaces of the plains and foothills, but by a different class of people, mainly Australians, whose contribution to the development of Canterbury was both profound and far-reaching.

From the first uncertain efforts at the beginning of the 19th century the Australian wool industry grew very rapidly; by 1850 there were 17,000,000 sheep in the Australian colonies. Merinos found the dry Australian conditions to their liking, and they were also found peculiarly suited to the new system of extensive grazing on the plains in the interior, where the sheep were left to fend for themselves far more than in Britain or Europe. The squatters gradually acquired experience of this new system and a desire to adopt it wherever they went. All their efforts were directed toward securing some recognition of their rights of occupation and some security of tenure, both of which they achieved by the mid-1840's.

If the Australian climate had been kinder, few of them might have bothered about New Zealand, but in the years just before the discovery of gold in Australia, economic depression associated with bad seasons resulted in station properties and sheep selling at very low prices, with the result that some Australian sheep farmers began to look elsewhere. Favourable reports appearing in some of their newspapers on the suitability of the Canterbury Plains for sheep farming decided those who could to make their way to Canterbury. They brought with them not only stock, but that invaluable prerequisite, experience in extensive sheep farming practices.

CANTERBURY'S CLIMATE



[*After a map supplied by the Meteorological Office, Air Department, Wellington.*

RAINFALL

Compared with that of most other districts of New Zealand the climate of Canterbury is considered dry, but measured by world standards the rainfall, even in the drier regions, is not really low. The map shows the mean annual rainfall pattern. Seasonal distribution of rainfall is fairly even, but periods of prolonged dry weather approaching drought intensity occasionally occur.

WINDS

The moisture-laden winds coming from the Tasman Sea precipitate their moisture on the ranges and the west coast and sweep on through the foothills and across the Canterbury Plains as a hot, dry wind reaching high velocities at times. These winds from a westerly and north-westerly direction predominate in inland Canterbury, and they are usually followed by cold south-westerly winds which bring rain and provide most of the rainfall of the lower-rainfall areas. Along the coast easterly and north-easterly sea breezes are almost as prevalent as northerlies and north-westerlies, often causing cloudy and foggy weather.

TEMPERATURE

Temperatures throughout the district mainly lie well within the temperate range, the mean annual temperature averaging from 50 degrees F. to 55 degrees F. in different parts of the district. Although the number of ground frosts from late autumn to early spring is considerable, the day temperature seldom falls below 45 degrees F.; in summer the temperature seldom rises above 70 degrees F. and long periods of uncomfortable heat are infrequent. Except in the high country snowfalls occur only two or three times a year, and only at very infrequent intervals does snow lie on the ground for more than a day.

Vague Descriptions of Runs

The land was now quickly taken up, and a list issued in October, 1853, by James Campbell, Government Commissioner of Crown Lands for the Canterbury Province, showing the names of those entitled to occupy certain areas outside the Canterbury block included 49 runs covering approximately 1,261,000 acres. Some of the descriptions of the boundaries of the runs were certainly far from definite; for instance, a description of the boundaries of one run of 25,000 acres was as follows: "Northward the river Ashburton, north westward the mountain range, south westward the river Hinds, eastward a line drawn parallel to the sea at such a distance from the mountains as shall give in one block the prescribed extent only".

By 1855 the whole of the plains had been taken up and only the back hill country remained. It was not long before this was occupied. The fashion to take up hill country was set by C. G. Tripp and J. B. Acland, who at the end of 1855 applied for blocks of hill country of 57,500 acres each in the Rangitata and Orari River gorges. By 1860 there was very little Canterbury high country remaining unoccupied, and extensive sheep farming was the picture, with a steadily increasing sheep population. The census for Canterbury for 1851 showed that there were 28,416 sheep in the area, and by 1858 the figure had reached 495,580 and 3 years later 877,400.

In the early stages of the squatter period many runholders had considerable numbers of cattle on their runs. When the executors of the late Captain Mitchell sold Mt. Grey Station in April, 1852, the stock consisted of breeding cattle, milking cows, heifers, horses, and bullocks, no mention being made of sheep, and in June, 1853, Caverhill of Cheviot was advertising for sale 500 head of cattle.

Some of the Australians who took up land between 1851 and 1854 and who became known as "shagroons" included C. C. Haslewood of Coringa, near Christchurch, MacDonald of Waireka, and Mark Stoddart of the Terrace Station. These squatters from across the Tasman were indeed hardy and resourceful and showed a certain degree of contempt for the Pilgrims on their small holdings. Burdon in his book "High Country" says of them, "These men rode scornfully past the small farms. With blanket and possum rug strapped to their saddles they made their way over hill and plain, forded creek and swam river, till they stopped at the foothills of the great range". However, not all of the Australians had been squatters, but most appeared to have had good colonial experience before settling in New Zealand. Two of the best known, Robinson of Cheviot and Moore of Glenmark, were able to buy up great areas of freehold land at a low price and create two of the largest estates in New Zealand.

Example Set by Australians

All credit for taking up large sheep stations cannot be given to the Australians, but undoubtedly they were mainly responsible for setting the example of what could be achieved. Many were well-educated Englishmen, and it is said that some of them who took on the hard life of the back country read Latin and Greek for pleasure. Of the Studholme brothers, who took up Te Waimate in 1854, John had received his education at Oxford. Rolleston, who took over Mt. Algidus Station about 1860 and who was afterward Superintendent of Canterbury, was a classical scholar, but he was also proud of the fact that he was one of the best bullock drivers in Canterbury. Tripp and Acland were sons of well-known West Country families. Some of these Englishmen knew little about sheep farming, but many recognised their deficiencies and employed Scotch shepherds who knew the work. Burdon in his book relates a story of Tripp that he used to visit Lyttelton on the arrival of an immigrant ship and as passengers came ashore he looked for those who had a good dog. His maxim was that only a good man had a good dog, and he would offer employment.

[From the Alexander Turnbull Library photographic collection.

Samuel Bealey, Superintendent of Canterbury from 1863 to 1866. During his term of office the west coast gold rush began and he was largely responsible for building the west coast road.

Price of Land Reduced

At this period of Canterbury's development it would not have been possible for many of the so-called squatters to make a profit out of grazing sheep if they had been required to freehold the land. Though the pastoral lease was a partial answer, it did not give any security of tenure, but in 1856, when the Provincial Government virtually acquired the responsibility for administering the land within its own territory, the squatters were the most politically active, and they thus safeguarded their position as much as possible. The Central Government's Waste Lands Regulations of 1853 had given them the right to acquire homestead areas, and one of the first acts of the Canterbury Provincial Government on managing its own lands was to reduce the price of land from £3 to £2 per acre.

[From the Alexander Turnbull Library photographic collection.

Sir Julius Vogel, who as Colonial Treasurer in 1870 initiated a programme of public works and immigration.

Runholders also obtained a "pre-emptive right" to acquire a homestead block of 250 acres and a similar right to 50 acres for "all lands occupied by any buildings, plantations, and any other improvements judged to be sufficient by the Provincial Waste Lands Board". In the late 1850's wire fencing was just coming into use, and the board considered fencing an improvement, and so it was not long before considerable areas were fenced. This pre-emptive right of the runholder to acquire land could be challenged by anyone desiring to purchase outright any part of the land, but the runholder could stave off the threat by buying 20 acres, as anything less than this area had to be put up for auction. This system of purchasing lots of 20 acres became known as gridironing. The process was one of the reasons why a committee set up by the Provincial Council in 1866 recommended that no further pre-emptive rights for improvements should be granted and that the existing ones should expire in 1880.

[From the Alexander Turnbull Library photographic collection.

William Rolleston, Superintendent of Canterbury from 1866 to 1876 and later Minister of Lands. He introduced a number of reforms in land legislation and established the first village settlements.

Gradually the squatters' rights were limited, and after the abolition of the provinces in 1876 the Land Act of 1877, designed to rectify the conflicting mass of provincial ordinances, included a provision for the purchase of land by deferred payments that was planned to help those with limited capital. But it was not until the advent of refrigeration in the 1880's that the challenge of the smallholder became a reality, and many of the large holdings had to be broken up.

The squatter had mainly fulfilled his purpose; he was prepared to put up with many hardships to create his station, he was renowned for his hospitality, but his day had to pass. Nevertheless, his monument, the sheep-farming industry, stands firmly on the foundation that he and his shepherds laid.

THE PROBLEM OF SCAB

Scab, perhaps the greatest bugbear of the early pastoralists, was a stock disease of very ancient origin, and first appeared in Australia in the early 1830's at a time when the squatting frontier was being pushed rapidly to the west, and, as a result, the whole country was speedily infected. Scab itself was caused by a parasite which

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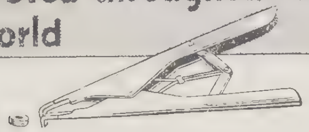

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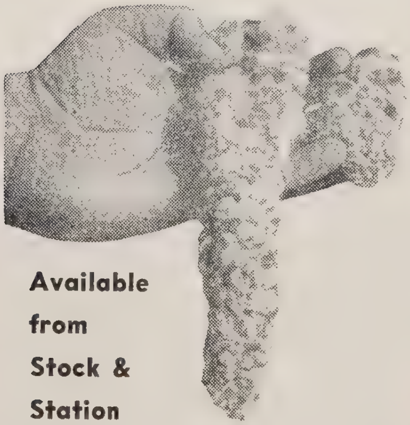

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burrowed just under the sheep's skin causing such an irritation that the sheep rubbed against any convenient object, especially another sheep. The constant rubbing caused a skin eruption, under which the parasite laid its eggs. If not treated, the eruption spread over the sheep's body, resulting in the wool falling out or becoming bedraggled. Infection spread so quickly that one sheep was always a menace to the whole flock, making immediate treatment imperative.

Danger Recognised

As practically all sheep were brought from Australia, it is not surprising that scab appeared in New Zealand in the 1840's, and it must have been soon recognised as a danger, for a New Munster (South Island) Ordinance issued in 1849 provided measures for its control. Nearly all the sheep in the South Island at that time were in Nelson, but the ordinance could not have been effective, as Nelson and Marlborough remained sources of infection until many years later. Scab was also mentioned by the Deanses at Riccarton in 1848.

When the Provincial Council was established in 1853 one of its first actions was to pass a Scab and Catarrh Ordinance, which made provision for the inspection of sheep, provided for the treatment of infected ones, and prescribed penalties for failure to do so. Inspection was to be made of all sheep entering Canterbury by sea, but little provision was made for controlling infected sheep arriving by land.

Sir William Congreve, a baronet, was the first sheep inspector appointed, but Canterbury squatters were fairly complacent, for in 1856 the "Lyttelton Times" claimed that Canterbury was about free of scab. But complacency soon vanished with the arrival of some infected flocks from Nelson, and in 1858 the Provincial Council was compelled in the face of widespread public clamour to turn again to the problem. The Sheep Ordinance passed by the Provincial Council late in 1858 met these demands, giving the inspectors wider powers and providing heavier penalties for breaches. Strict control was imposed on all sheep entering the province by land or sea, and any owner of sheep infected with scab was liable to a fine of up to 5s. for each sheep.

Magistrates could suspend payments for 6 months, and if the sheep were found to be clean at the end of that period, the fine could be remitted. Notice had to be given to neighbours if sheep were found to be scabby; they were not permitted to be driven on any public highway and they had to be herded by day and yarded by night. The whole flock was to be considered scabby if any scabby sheep were found in it. Fines were provided for breaches of all these sections.

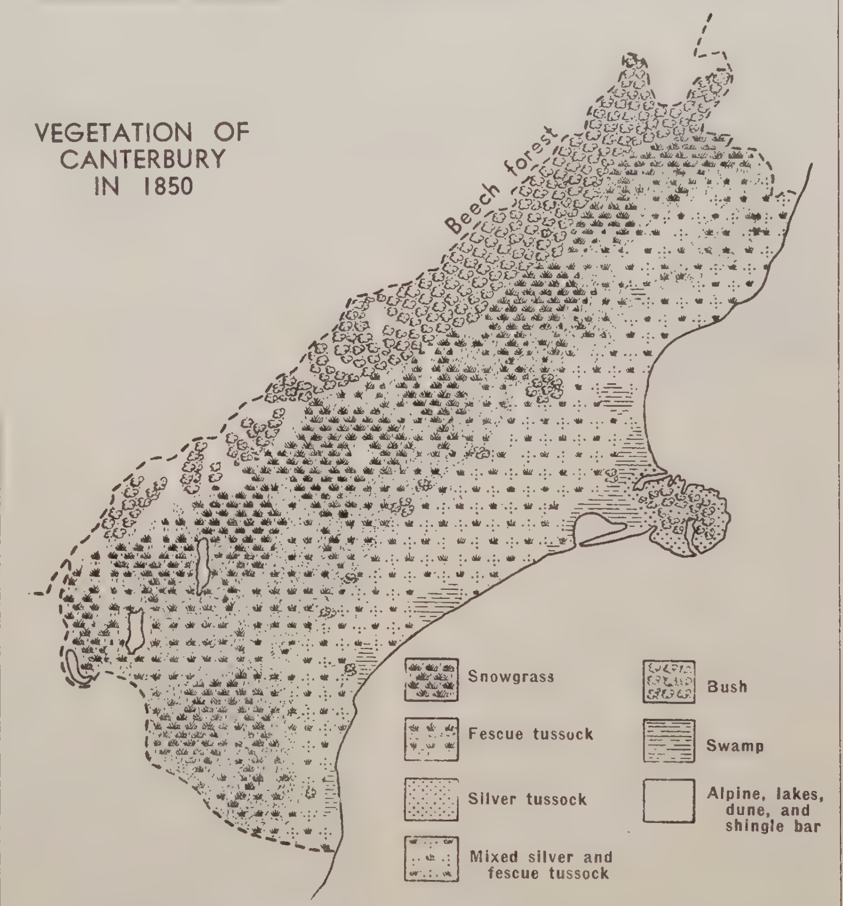
Stricter Ordinance Enacted

Scab was at its worst in 1863-64, the number of sheep infected during that year being 192,000, and the sheep inspector estimated that 5 per cent. of the sheep in the province were scabby. The Provincial Council was forced to enact another ordinance, tightening up the provisions of the earlier one and compelling runholders to erect dips. During 1864 Glenmark Station in North Canterbury paid £2400 in fines and was reported as scabby every year until the Provincial Gazette ceased publication in 1876. It was finally declared clean in 1877 after thousands of sheep had been boiled down.

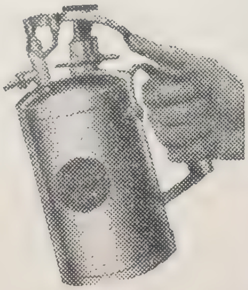
Scab began to decline in Canterbury from 1869 onward, and by 1876, when the Provincial Council was abolished, only three cases were reported in North Canterbury. By that time the problem was well under control, the chief danger being its prevalence over the provincial border in Marlborough and Nelson.

The economic loss caused by scab is difficult to estimate, as its depredations, unlike those of rabbits, occurred at a time when prices were fairly stable, but the cost of remedial measures must have been a serious drain, especially at a time when many runs had not reached a profit-making stage. Sheep were lost as a result of the drastic treatment they had to undergo, and money had to be spent in providing dips and water-heating equipment; most serious of all, labour had to be diverted to treating the sheep and carting the firewood to heat the water.

When the first Scab Ordinance was passed by the Canterbury Provincial Council in 1853 one inspector was appointed, and on his resignation in 1858 two inspectors were appointed; the number was subsequently increased to three in 1863 and finally to four a few years later. Under the 1878 Sheep Act the number of inspectors was increased again, though in 1882 they were compelled to undertake the work of rabbit inspection as well. The


VEGETATION OF CANTERBURY IN 1850
Beech forest
Snowgrass
Bush
Fescue tussock
Swamp
Silver tussock
Alpine, lakes, dune, and shingle bar
Mixed silver and fescue tussock

The combination of topography and climate largely determines the type of vegetation found in a country and this is well illustrated in Canterbury. Near the main divide, with its higher rainfall, beech forest predominates, and further east, where drier winds make the rainfall less effective, a semi-drought-resistant form of vegetation has developed in the form of tussock grasses. On the areas between about 3000 and 5000ft. this tussock consists of sub-alpine snowgrass or tall tussock grassland, and on those between about 1000 and 3000ft. fescue tussock grassland predominates. Below 1000ft., on the plains and downlands, a mixture of fescue and silver tussock was the predominant vegetation before settlement. In low-lying areas near the coast, particularly around Christchurch and south of the Ashburton River, there occurred typical swamp vegetation. A considerable portion of Banks Peninsula, which has a different soil type, higher rainfall, and warmer temperature, was originally covered with rain forest similar to that in many parts of the North Island.



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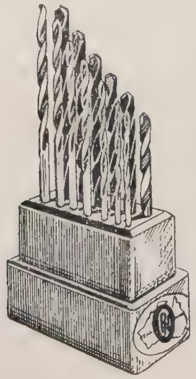

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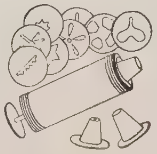

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inspector's position was often difficult, as he was often accused on the one hand of abusing his powers and on the other of being lazy and incompetent. But from the small sheep inspectorate can be traced the beginning of the present Department of Agriculture.

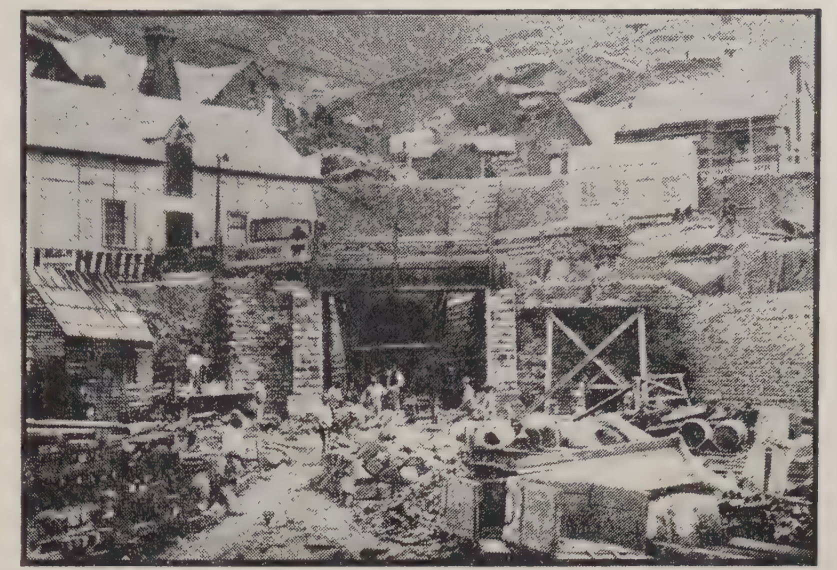
EXTENSION OF FENCING

In the early stages of the Canterbury settlement fencing was confined to the small agricultural farms around Christchurch and Banks Peninsula, the boundaries of the pastoral runs being nearly always marked out by some natural feature such as a river or a leading ridge. Until wire came into general use in the 1860's fencing by ditch and bank was slow and expensive and suitable only on flat or rolling country. The Deans brothers in their report to Captain Thomas suggested that the ditch and bank fence planted with gorse or hawthorn on top was the most lasting and economical fence in that part of the country, a good labourer being able to build half a chain a day. Post and rail fences were not considered suitable in Canterbury, because of the scarcity of timber and of its perishable nature.

Wire fencing materials were advertised as early as 1851 and were mentioned by Archdeacon Paul in 1857. By 1860 it was becoming sufficiently common for a Provincial Ordinance on fences to insist that the wires be painted white.

By this time wire fences were being built around the homestead blocks on some stations, though the use of this type of fence as a boundary did not come into general use until a few years later. Wire used in the 1850's was of very heavy gauge, which made it difficult to strain and awkward to carry over rough country. Wire was frequently used on top of sod walls, two wires being stretched along the top, and wire replaced gorse occasionally, but often the two were used together. As Canterbury was not troubled by rabbits to any great extent, the sod walls did not become honeycombed with burrows as they did in Otago and Southland.

According to Acland, the first wire boundary fence was put up in 1865 between Malvern Hills and Rockwood, and at Waimate the Hakataramea boundary was put up about the same time. Many of the runholders built fences to take advantage of the clause in the provincial land legislation which allowed them to claim 50 acres of land for every 40 chains of fencing.



[From the Alexander Turnbull Library photographic collection.

The Lyttelton tunnel under construction. Work was begun in 1860, recommenced in July, 1861, and completed in December, 1867. It was by far the largest engineering project undertaken in New Zealand up to that time.

The Orari basin, part of the land taken up by C. G. Tripp, who with J. B. Acland was the first squatter to occupy high country in Canterbury.

EXPANDING PRODUCTION

Wool prices were fairly stable during the 1850's, but for the established squatter the sale of sheep to the aspiring one was the most profitable side of the business. The Australian "shagroon" Mark Stoddart, writing in 1851, lamented the high price of sheep (from 16s. to £1 a head) and the limited number available, the transporting of them from Australia being risky and slow. Right up to the mid-1860's, when the demand began to slacken off as the country became fully stocked, the price of sheep remained high, usually from £1 to 30s. a head, the upper limit being probably determined by the cost of bringing sheep from Australia. This must have become easier after Stoddart wrote, as thousands were brought in.

All the wool was consigned to England, with occasional shipments to Australia, and from 1857 to 1861 the Customs Department calculated the value of exports at the uniform rate of 16d. per pound. Freight rates were heavy in those days, the wool was of uneven quality, and the amount produced per sheep was low, yet most of the squatters seemed to do fairly well. Those who came from Australia had experienced most of the crises, except snowstorms, that were likely to occur in Canterbury, and knew how to adapt themselves. Samuel Butler arrived in Canterbury in 1860 with £4000 capital, which he intended to double as soon as possible. He sold out in 1863 for £10,000, succeeding in his aim. Butler, a man of shrewd common sense but without experience, managed to do this on one of the less promising stations in Canterbury; those on the plains, taken up a few years earlier, must have been a great deal more profitable.

The social structure of Canterbury during the 1850's though deviating somewhat from the strict Wakefield mould, was not exactly one to promote

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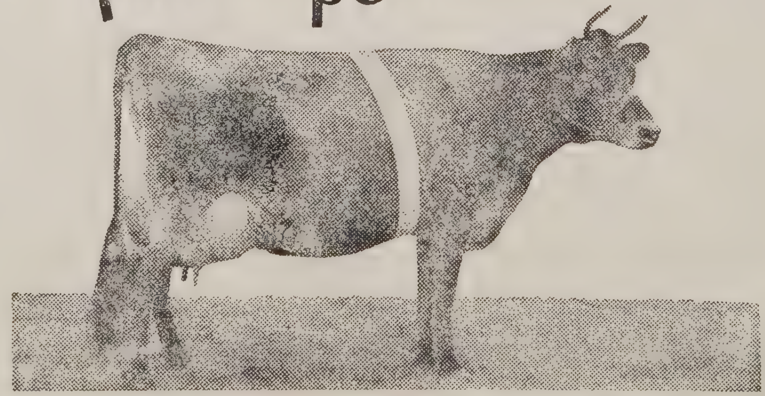

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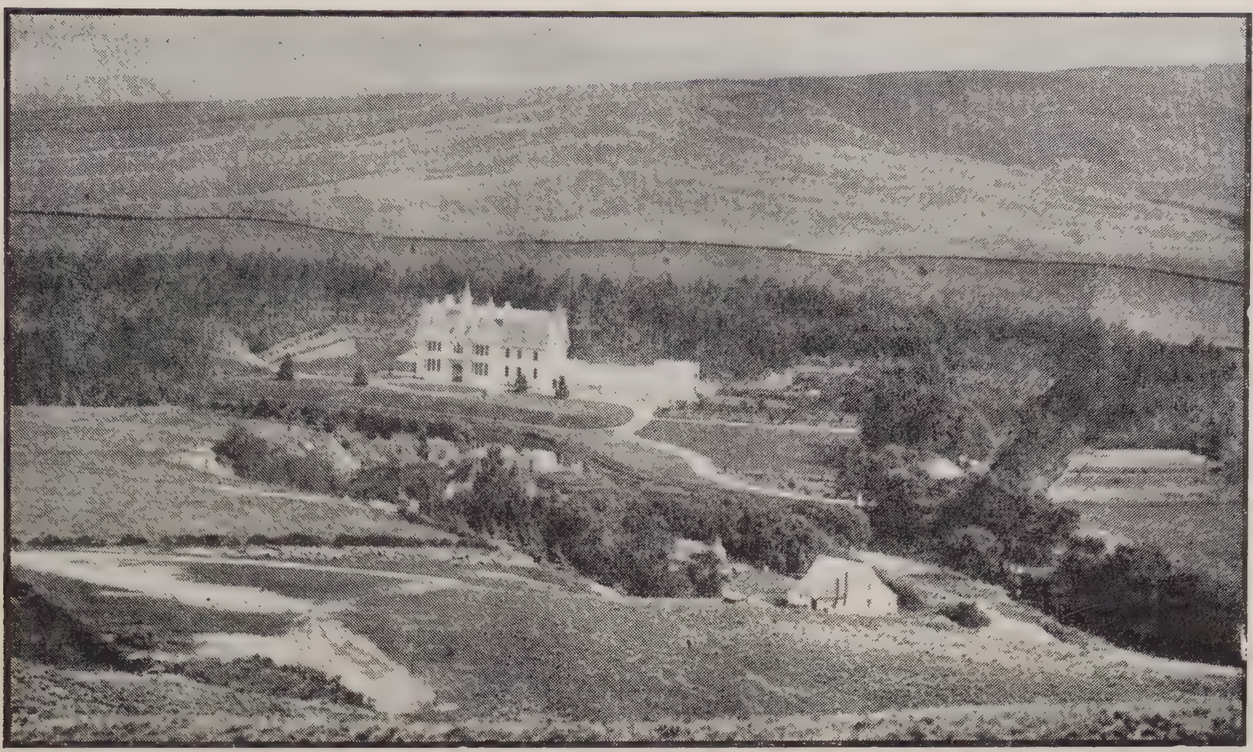

The Glenmark homestead. G. H. Moore of Glenmark came from Tasmania and took up Glenmark in 1854. Ultimately he built up one of the largest fortunes ever made from the land in New Zealand.

equality of opportunity. To obtain and stock a pastoral lease cost at least £2000, and probably more, even though rents were less than a penny per acre; to buy land for an agricultural farm cost £3 per acre at first and £2 per acre from 1856 onward, a price sufficient to deter a man of limited means.

Sheep farming is essentially economical of labour, but nonetheless there were frequent complaints of labour shortages and of the excessive rates of wages. At the beginning of the settlement wages were generally 4s. 6d. a day, but after the discovery of gold in Australia the rate rose to about 8s. a day and even more in the back country. For their keep the men employed on the runs received generous quantities of mutton, flour, tea, and salt, but little else; if many of the labourers spent most of their wages on hard liquor, numbers of them, particularly Scotch shepherds, saved carefully and were able years later, when the squatters were in difficulties, to acquire land of their own.

Steady Advance

Canterbury in 1860 had successfully passed the pioneering stage and had settled down to a steady if prosaic advance. Total exports in 1854 were £14,700, including £7100 for wool; by 1861 these figures had risen to £213,500 and £195,000 respectively. The quantity of wool exported rose from 122,600lb. in 1854 to 2,925,375lb. in 1861. Wheat exports were worth nearly £4000 in 1860, but with the gold discoveries in Otago and the rapid rise in bread demand, no more was exported for some years.

Though there must have been some disruption caused by the departure of farm workers to the goldfields, most of them probably did not stay long, because in the years 1861-64 the population of South Canterbury doubled, and, as most of the new arrivals did not come by sea, they must have come from Otago.

The increase in the population and the greater profitability of agriculture stimulated in turn a demand for land to be made available for closer settlement. The squatters displayed a stony hostility to any settlements of small farmers in their neighbourhood, as the reference in Lady Barker's "Station Life in New Zealand" to the "nest of cockatoos" near at hand and the disparaging attitude of the runholders toward it shows. As in Otago, the small farmers were beginning to challenge the squatters' entrenched privileges. The squatters during the 1860's experienced something else that was new—a drop in the price of wool. After freight was allowed for, prices averaged from 12¾d. to 13¼d. from 1861 to 1866, but began to fall in 1867, dropping to 8¾d. in 1869.

Falling Prices Lead to Depression

Wool, being sold on a world market, was not affected by the gold discoveries in New Zealand, but the drop in prices from 1867 onward corresponded closely to the decline in the output of gold. This latter decline meant also a drop in the demand for agricultural produce, the price of wheat falling from 6s. per bushel in 1867 to 4s. 1d. in 1870. The fall in the price of wool, the drop in gold production, and the continuation of the Maori Wars combined to produce by 1868 a minor depression.

That year unemployment began to be seen in Christchurch, but 2 years later a Provincial Council committee investigating the subject reported that plenty of work would be available if wage rates were not so high. Between 1860 and 1869 labourers' wages were from 6s. to 7s. a day, skilled workers receiving 9s. to 12s. a day, but in 1869 wages fell somewhat, the rate for ordinary labourers dropping to 5s. to 6s.

Though little more was heard of the matter, it was against this background of stagnation that Julius Vogel in July, 1870, announced his policy of public works and immigration. It was not his policy alone; in 1869 Edward Stafford had declared himself in favour of a similar one, and the issue of borrowing for public works was a familiar one in Canterbury provincial politics.

Vogel's original proposals for land settlement to be linked with immigration and public works required the co-operation of the provinces, in whom the control over waste lands had been vested since 1856, but such co-operation was conspicuously lacking. The resumption of land for settlement along the routes of the proposed railways would have fulfilled two aims; it would have settled a larger proportion of immigrants on the land and secured for the State the increased value of

GROWTH AND EXPANSION IN 1870's . . .

the land, contributing in a large part to the cost of the railways. Opposition to any surrender of provincial rights arose from a mixture of self-interest and a desire to retain local autonomy, and was sufficiently strong to prevent any proposals for the large-scale resumption of land being passed. Vogel himself did not feel impelled to press the issue.

Land Values Soar

Whether there was a full realisation in Canterbury of the heights that the land boom would reach or why the boom should have been so largely confined to Canterbury is impossible to say. The provincial authorities were still continuing to sell land at the high price of £2 per acre, and up to 1871 it was sold in fairly modest quantities. In 1866, when runholders were taking advantage of their pre-emptive rights, over 86,000 acres were freeholded, but in the next few years the figure fell off, being just over 15,000 in 1869. With the speeding up of railway construction in 1872, the area freeholded rose to 105,000 acres and reached a maximum of 585,000 acres in 1878.

The way was clear for a wild boom in land values, and as the boom gathered momentum values soared in places miles away from any railway or proposed railway. The large squatters, partly from the need for self-protection, but largely from a desire to profit, freeholded as much of their land as they could, often mortgaging their properties to do so. Very few squatters had their land purchased over their heads, even if they were afraid of the possibility. The boom reached its height in the areas around Christchurch, the newspapers during 1877 and 1878 containing accounts of farms selling at over £20 per acre around Templeton and Rolleston, land which a few years earlier had been purchased at £2 per acre. Similar prices were given for land close to Timaru.

A favourite device for selling land at an inflated price during the years 1877-78 was the selling of sections in new townships. A typical advertisement from the "Lyttelton Times" in July, 1878, drew attention to the sale of "The whole of the remaining sections in the township of Freetown situated in the centre of Horsley Downs." One wonders if there were many buyers for the 67 sections advertised. The report of the Secretary for Crown Lands in 1879 forms an interesting conclusion, as he said, "In the Canterbury Land District, for instance, there is very little Crown land remaining that anyone would care to purchase at £2 an acre."

Prosperous 1870's

A boom in land values, a rise in prices of wool and wheat, and large-scale Government spending all contributed to the prosperity of the 1870's. Wool prices began to rise again in 1871 and reached 15d. a pound in 1872, but fell gradually to 10d. in 1877. Wheat prices followed a different course, ranging from 4s. 6d. to 5s. a bushel between 1870 and 1876, but rising to 6s. 3d. in 1877 and dropping the following year.

How the land boom survived the drop in the price of wool is hard to understand, but another notable feature of the 1870's was the great increase in productivity. Wool exported amounted to 8,000,000lb., valued at £458,000, in 1865; 12,486,000lb., valued at £490,000, in 1870; 15,000,000lb., valued at £1,000,000, in 1875, and 16,127,000lb., valued at £700,000, in 1880.

A large part of the improvement during the 1870's came from the increase in sheep numbers on the plains, where the carrying capacity was raised by the sowing of English grasses. There was little increase in the number of hill-country sheep. In the late 1860's and 1870's production of wool was increasing much faster in Otago and Southland than in Canterbury, but from 1875 the rabbits brought this advance in the south to a halt.

With the decline in wool prices from 1875, farmers on the better-class land turned increasingly to wheat, the area in wheat rising from 52,000 acres in 1870 to 194,000 acres in 1880.

The sharp fall in world agricultural prices in 1879 brought the boom in land to a sudden end, and the effect of this, combined with a drop in Government spending, a fall in imports, and a general lack of confidence in the future, brought about a general depression as sudden as it was complete. According to one estimate, land values in Canterbury increased sevenfold during the period, and as the production of the land increased, at a much more modest rate, the difficulties of many farmers and runholders who had bought late can be easily imagined.

Despite the demand for labour on public works, the influx of immigrants must have tended to keep wages from rising, because in 1873 station labourers were paid 17s. 6d. to £1 a week, with keep; this rose to 25s. in 1876 and dropped again to 15s. to £1 in 1880. Shepherds as skilled men were not affected so much by the sudden onset of depression, for they were receiving £50 to £60 a year in 1873 and £65 to £70 in 1880.

Lack of Amenities

With the collapse of the Vogal boom, there was a general desire to make him and his policy the scapegoat. Yet it is difficult to imagine today just how lacking New Zealand was in the ordinary amenities of life before 1870. There were only 700 miles of telegraph line and 46 miles of railway in three separate gauges. Main roads were little more than bullock tracks, rivers were unbridged, and the towns lacked sanitation, lighting, and paved streets.

By 1880 the Canterbury Plains were beginning to assume their present appearance, most of the land being sown down in English grasses or in crop and the homesteads being surrounded by young plantations and shelter belts. But the homesteads were much fewer. Roads had been formed over most of the plains, and the railway system was much as it is today. Canterbury's population had just passed the 100,000 mark, and exports stood at £1,329,000. Nearly 1,300,000 acres of land had been broken in; 193,000 were in wheat, 153,000 in oats, and other crops covered 140,000 acres. Wheat production had reached 5,000,000 bushels annually and had taken third place among the country's exports. With the improvement in the pastures of the plains and downland, sheep flocks were still increasing rapidly, reaching 3,608,000 in 1880. Canterbury in the next decade was preparing to assume Otago's place as the greatest producer of wealth in New Zealand.

Vaccination Against Contagious Abortion

APPLICATIONS by farmers for vaccination of their calves against contagious abortion in 1951 are now due. The charge is 1s. 6d. per calf for the first 14 calves in any herd and 1s. 3d. per calf thereafter. The closing date for applications is January 13 and a late fee of 10s. is payable on all applications received after this date.

As in previous years members of veterinary clubs should apply to the secretary of their club and other farmers should apply to their nearest Inspector of Stock, from whom they can obtain the necessary application forms. Applications to Inspectors of Stock must be accompanied by a cash payment calculated on the basis of the charges mentioned above.

It is desirable that applications be sent in as early as possible so that vaccinating officers can arrange the work efficiently. Farmers are therefore requested to forward their applications by January 3.

Journal of the British Grassland Society

The Journal has been instituted as a medium for the publication of the results of research and practical experience in the realm of Grassland Husbandry.

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1. Day-Length and Head Formation in the Ryegrasses.—J. P. Cooper.
2. Experiments on the Yield of Lucerne Strains as Pure Plots and on the Behaviour of Lucerne when Sown in Mixture with Various Species of Grasses.—Watkin Williams.
3. Serradella (Ornithopus sativus): A Legume for Light Acid Soils.—J. L. Schofield.
4. Investigations on Local Strains of Herbage Plants. 1. Kent Indigenous Perennial Ryegrass.—R. P. Hawkins.
5. An Examination of Some Observations of Soil Temperatures.—R. W. Gloyne.
6. On the Influence of the Composition of Pasture Herbage on the Production of Dairy Cows and on the Benefit of Supplementing the Grass with Protein Poor Foods.—B. Sjollema.

This Journal is published quarterly. Subscription Vol. 1, 10s. Annual subscription thereafter 20s. Orders to Secretary, British Grassland Society, Walsingham, Norfolk.

Improved Pricker Pad

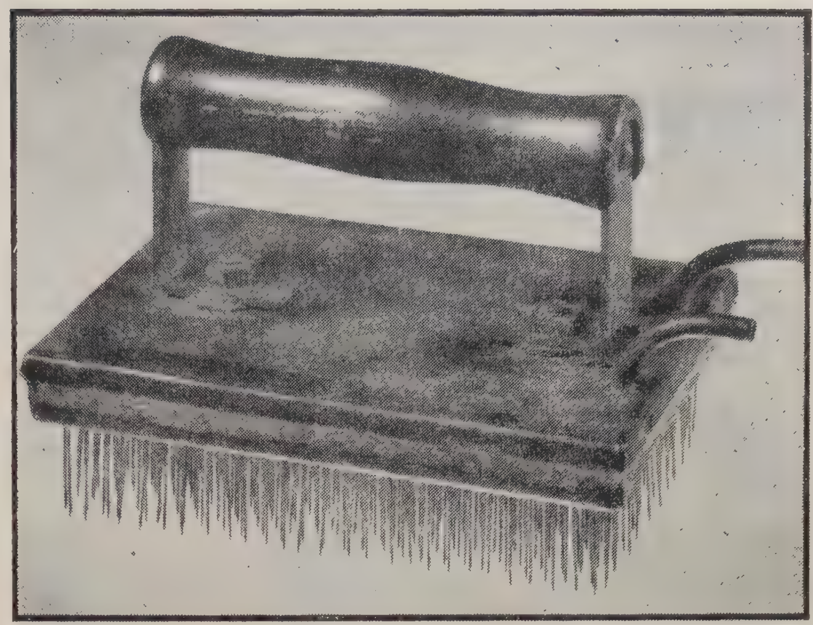
BEEKEEPERS in areas where the honey produced will not leave the combs freely use an implement known as a pricker pad. This article by D. Roberts, Apiary Instructor, Department of Agriculture, Auckland, describes an improved pricker which requires less time to operate, is less severe on combs, and enables more honey to be extracted.

HEAVY thixotropic (jellifying) honeys cannot be satisfactorily extracted without the use of a pricker pad. To manipulate the pricker in its present form is tedious and severe on the combs. In addition complete removal of the honey from the combs is not possible, as not more than from 75 to 80 per cent. can be recovered. Because of the extra work entailed, the reduced life of the combs, and the limitations to the amount of honey that can be extracted, any improvement in the design of the pricker pad that will increase its efficiency should be welcomed by apiarists.

Messrs. Belin brothers, of Milford, Auckland, operate their apiaries in an area where the honey produced is mainly manuka and they have developed a steam-heated pricker pad of greater efficiency than the type in general use. Results over a period indicate that much more honey can be obtained from the combs and it is not unusual for the combs to be extracted entirely free of honey.

Construction of Pricker

Damage to combs is practically eliminated and the time saved is considerable, as the combs are pricked on one side only. Although the pricker is not as simple to make as the common type, its construction should not be beyond the average beekeeper. No high degree of technical skill is required, but the work takes time, and accuracy in the positioning of the pins is essential.



[*Sparrow Industrial Pictures Ltd. photo.*

The steam-heated pricker pad.

Materials

The materials required are three pieces of 18-gauge copper sheet, one 7in. x 6½in., one 6in. x 5½in., and one 6½in. x ¾in.; 2 strips of metal 3¾in. x ¾in.; 2 pieces of copper pipe similar to that used for the boiler of the uncapping knife; 1 wooden handle about 5in. long (the handle of a discarded electric iron is excellent for the purpose); 2 brass bolts ¼in. in diameter and ½in. long with nuts and washers; and about 700 heavy-gauge plated brass pins 1⅛in. to 1½in. long (the type known as blanket pins is satisfactory).

For those who have not access to a high-speed drill, 18-gauge brass sheet could be used in place of copper, as brass is much easier to drill.

Necessary tools are a soldering iron, tin snips, and a small drill.

The working surface of the pricker illustrated is 5in. x 4¾in., sufficient to treat one-sixth of a comb at each insertion.

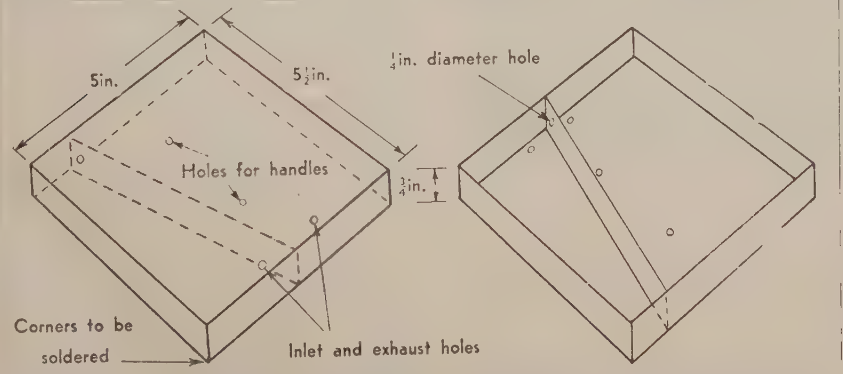


Fig. 1—Top of steam chest (left) and steam chest reversed to show baffle (right). Note that the baffle is placed between the inlet and exhaust holes and so that it does not obstruct the holes for the handle.

Making Steam Chest

A square of comb foundation is laid over the piece of copper 7in. x 6½in. and an area 5in. x 4¾in. is marked out for drilling, care being taken that the holes are in the middle of the cell bases. An area ¾in. wide is then marked out all round the area to be drilled and the metal remaining outside the drawn lines is bent up to form a shallow oblong container ¾in. deep. This serves as the steam chest.

When the holes for the pins are being drilled a piece of wood should be attached to the underside of the metal so that the holes continue through the wood. This forms a jig which will ensure that the pins maintain their correct position when soldered into place. Care should be taken in drilling to ensure that the holes provide for a neat push fit only.

After the sides and ends have been formed and the pins soldered into position a strip of copper ¾in. wide is fixed lengthwise in the centre of the container. This strip has a ¼in. hole bored ½in. from one end, and the strip is placed in position with the hole at the end opposite the steam inlet and exhaust openings. The piece of copper sheet 6in. x 5½in. is then bent over ¼in. all round to form the lid of the steam chest. Before the lid is soldered in place, two ¼in. holes are drilled 3½in. apart to take the bolts which hold the handle brackets. The strip when affixed should be given sufficient diagonal inclination to clear the heads of the bolts which hold the handle brackets. Two further holes are drilled ¼in. from the end of the lid to take the copper steam inlet and exhaust pipes, which should be of the same size as those used in the uncapping knife so that an equal distribution of steam is obtained. These holes must be positioned so that they fall

CONSTRUCTION OF STEAM-HEATED PRICKER PAD

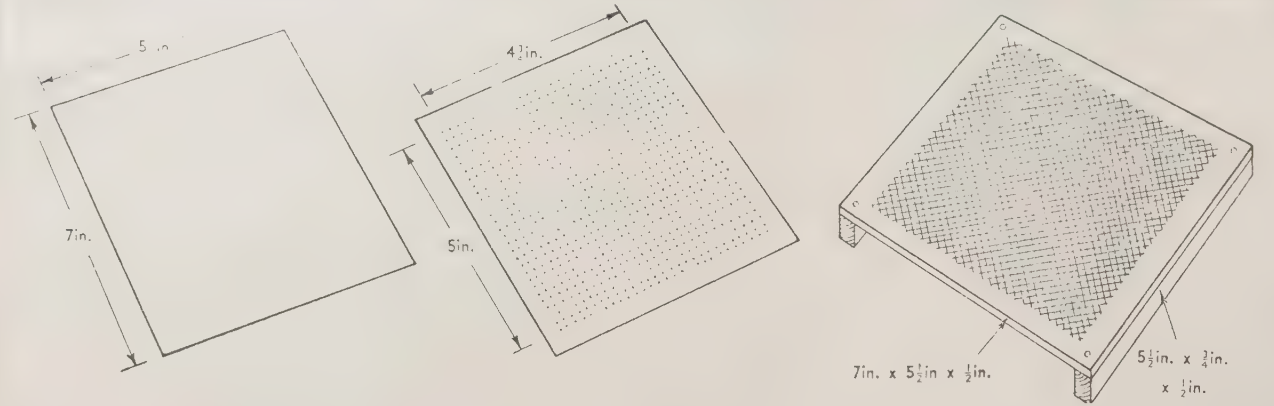


Fig. 2 (left)—Bottom of steam chest before drilling. Fig. 3 (middle)—Bottom of chest, showing area of drilled holes. Fig. 4 (right)—Jig and bottom plate screwed in place and marked for drilling.

one on each side of the central dividing rib to ensure that steam is constantly available the full length of the pad. Steam should flow from the inlet along the container to the hole in the central rib at the opposite end, back along the other side to the exhaust. The pad is thus maintained at a constant temperature all over.

Alternative Method of Construction

Another and perhaps simpler method of construction is shown in Figs. 1 to 5. The top sides and ends of the steam chest are made from a sheet of metal 7in. x 6½in. (Fig. 1) and the working surface which is the portion containing the pins is made from a piece of metal 7in. x 5½in. (Fig. 2). This piece is screwed to a block of dressed wood with squared edges (Fig. 4). An area 5in. x 4¾in. is marked out (Fig. 3) using comb foundations as a guide for the pin holes. To plot the holes with greater accuracy a carpenter's bevel may be employed to form a series of diagonal lines from each side, the pins being inserted at the points of intersection. After the holes are drilled and the pins soldered into place the piece of metal which has been formed into the steam chest including the dividing rib is now placed in position and the two sections soldered together, excess metal being then cut away. In this method the working surface holding the pins is not turned up, but is simply a flat plate and is held to the steam chest by a fillet of solder (Fig. 5).

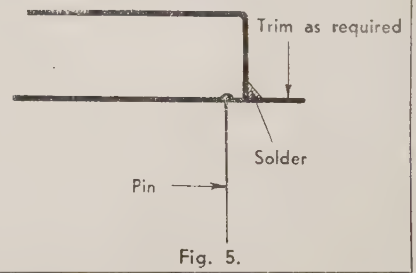


Fig. 5.

To ensure that the hands do not come into contact with the hot steam chest, the handle brackets should be arranged so that the handle is at least 1½in. above the steam chest.

Use of the Pricker

It will be noted that the dimensions are considerably smaller than those of the type of pricker in general use, as similar dimensions applied to this type would be unsatisfactory, because the pins are pushed completely through the midrib of the comb, which creates resistance. Experience has proved that penetration of the comb midrib by the pins does no harm and the bees repair the punctures immediately the combs are replaced on the hive. The comparatively light-gauge pins do not damage the cell bases and the bees are not induced to build drone comb, as is frequently the case when combs are torn about by prickers of the orthodox type.

In use the pins are pushed completely through the midrib of the comb thus breaking the adhesion of the honey to the cell walls simultaneously on both sides of the comb.

A slight see-sawing motion is used when pressing the pins into the honey. The usual type of metal tray with a raised centre on which to rest the combs is used. When not in use the pricker should be suspended by the handle to a bracket within easy reach. A metal drip tray is fastened underneath the bracket to catch any honey dripping from the pricker.

◆

Australian Rice Harvest

[*Australian Official Photograph.*

A GOOD growing season in 1949-50 and perfect harvesting conditions resulted in a near-record Australian rice crop. At present rice is grown commercially in only one Australian State, New South Wales. In 1949-50 about 72,000 tons of rice were harvested from 36,250 acres sown (26,795 acres in the Murrumbidgee irrigation area and 9455 acres in the Wakool-Tullakool irrigation area). Australia's record rice crop was 75,000 tons from 40,500 acres in the 1943-44 season. The illustration shows the bagging platform of a self-propelled auto-header. However, many Australian rice farmers prefer horses for drawing their pneumatic-shod engine-operated headers, because horses move at a slow, even, and economical speed in heavy and sometimes boggy rice fields.

North Island Porker and Baconer Competitions, 1950

By A. LONGWILL, Superintendent of the Pig Industry, Department of Agriculture, Wellington.

IN the 1950 porker and baconer competitions conducted at Westfield, Patea, and Tomoana freezing works by W. and R. Fletcher (N.Z.) Ltd. 5640 pigs were entered. The number, while large for a competition, is only about 4 per cent. of the total pigs passing through the three works and probably represents the efforts of the keener pig producers to whom the competitions offer a measure of their progress in the improvement of carcass quality. The general quality of the entries therefore may be regarded as being slightly above the average for the Dominion, and a study of the carcass-quality characters in these pigs gives an indication of the directions in which effort is required to produce better-quality carcasses.

[*Sparrow Industrial Pictures Ltd. photo.*

Mr. J. B. Swain congratulates the winner of the special award he announced at the Westfield works field day on behalf of the Worshipful Company of Butchers of the City of London. It was a medal for the grand champion team of porkers; a similar award was made to the grand champion baconer team winner.

THE judging standards adopted for the competitions are designed to encourage the production of the type of carcass most suited to market requirements. For that reason and because information gained from the competitions may determine their effectiveness, judging standards require frequent revision. Since the 1946 competition, with which the latest results will be compared, an appraisal of belly thickness has been included in the judging system and the loin fat standards for baconers have been relaxed by 1/16in.

In this analysis comparison is made wherever possible with the results of the 1946 competition, when new pig-carcass judging standards were introduced. An analysis of the results of that competition by D. M. Smith, Research Officer, Department of Agriculture Animal Research Station, Ruakura, appeared in the February, 1947, issue of the "Journal".

Compared with the 1946 competition, when 3480 pigs were entered, there has been a tendency for carcass-quality characters to suffer. Both porkers and baconers are shorter at the same weights and carry too much fat at all weights above 90lb. Balance of side has also suffered. To secure the improvement required attention must be given to selection of breeding stock for carcass quality and to feeding to avoid the excessive deposition of fat.

Length and Depth of Carcass

The points allotted for length and depth of carcass were: Body length, 20 points; balance of side, 5 points.

Porkers

A comparison of the average length and depth of porker carcasses in 1946 and 1950 can be made from Tables 1 and 2.

The carcasses are on the average 1½ to 2in. short on present standards, scoring only a little over half the possible points. In each range they are shorter than the 1946 pigs. The overall average figure indicates a significant decrease in length in each weight range compared with 1946 results and suggests that much more attention should be given to this character.

TABLE 1—AVERAGE FIGURES FOR PORKERS WITHIN CERTAIN WEIGHT RANGES, 1946

Weight range (lb.) ..	61-65	86-90	116-120
Average length (in.) .	24.9	26.83	29.05
Optimum length (in.) .	26.37	28.25	30.5
Average depth (in.) .	10.3	11.1	12.4
Optimum depth (in.)	10.1	10.8	11.6
Average ratio of depth to length ..	41.4%	41.4%	42.7%
Optimum ratio of depth to length .	40%	40%	40%

TABLE 2—AVERAGE FIGURES FOR PORKERS WITHIN CERTAIN WEIGHT RANGES, 1950

Weight range (lb.) ..	61-65	86-90	116-120
Number of pigs ..	65	369	74
Average length (in.) .	24.28	26.78	28.48
Optimum length (in.)	26.37	28.25	30.50
Average depth (in.) .	9.93	11.14	12.41
Optimum depth (in.)	10.1	10.8	11.6
Average ratio of depth to length ..	40.9%	41.6%	43.6%
Optimum ratio of depth to length .	40%	40%	40%

TABLE 3—BODY LENGTH, BACONERS, 1946

Weight range (lb.) .	121-125	146-150	166-170
Average length (in.)	28.9	30.09	31.13
Optimum length (in.)	31.25	32.5	33.5

In depth of side lightweight porkers are below the optimum measurement, and though this still gives a well-balanced pig, it is not as important in porkers as in the higher weight ranges where, as will be seen, this factor becomes progressively worse. The 1950 results revealed that, compared with those of 1946, balance of side has deteriorated in heavier porkers.

Baconers

There has been a decrease in length in baconers which persists throughout all weight ranges. The tendency to decrease in length in 1950 is apparent from Tables 3 and 4, although the ranges taken are not the same in the two years. Baconer carcasses are, on the average, 2 to 2½in. short of the length necessary to score maximum points.

No figures are available from 1946 to compare with 1950 results on the depth of side of baconers. With optimum depth 40 per cent. of the actual body length in each weight range, the balance of side becomes progressively worse with increase in weight of carcass. Actual depth is not seriously excessive if only body length were up to the optimum standard.

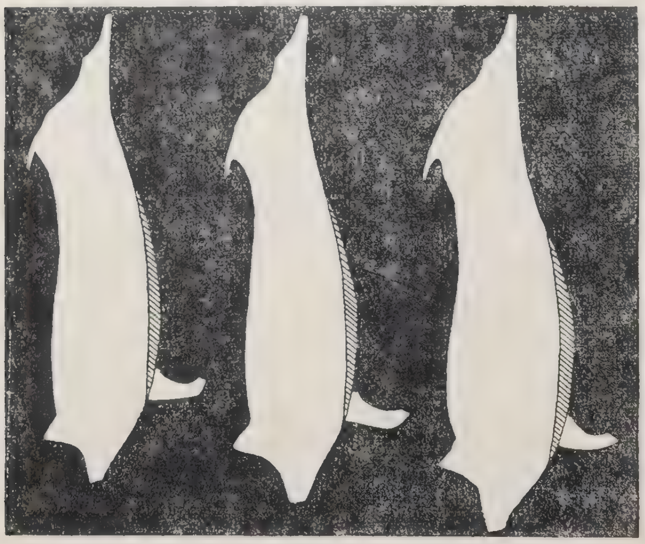
Backfat

The points allotted for backfat were: Shoulder: 10 points; loin: baconers, 20 points; porkers, 15 points.

TABLE 4—AVERAGE RESULTS, BACONERS, 1950

Weight range (lb.)	121-130	131-140	141-150	151-160	161-170
Number of pigs	398	565	765	612	377
Average length (in.)	28.8	29.45	29.99	30.62	30.94
Optimum length (in.)	30.70	31.20	31.7	32.20	32.70
Average depth (in.)	12.42	12.7	12.97	13.35	13.70
Optimum depth (in.)	12.30	12.50	12.70	12.90	13.10
Average ratio of depth to length ..	43.1%	43.1%	43.2%	43.6%	44.3%
Optimum ratio of depth to length	40%	40%	40%	40%	40%

PORKER AND BACONER COMPETITIONS



	121-130lb.	141-150lb.	161-170lb.
Length ..	22.8in.	30.8in.	30.9in.
Ideal depth ..	11⅝in.	12in.	12⅜in.
Actual depth .	12⅝in.	13in.	13⅜in.

Diagram showing the extent to which in each weight range New Zealand pigs on the average exceed the ideal depth in relation to length.

Porkers

Both shoulder and loin measurements show an increase over 1946 in all but the 91-105lb. class, in which they are less.

Shoulder-fat thickness judged by these results is slightly below the optimum in the 60-75lb. and 76-90lb. classes, but thereafter the optimum shoulder-fat thickness is exceeded. Loin fat is below optimum in all classes, but improves in the 106-120lb. class. As carcasses generally are fatter, lighter porkers have a backfat thickness closer to the optimum laid down in the judging standards.

Baconers

Baconers also show an increase in shoulder fat over 1946 carcasses. The 120-130lb. class shows an increase of more than ⅛in. and this increase is continued in each weight class, reaching 3/16in. in the 151-170lb. carcasses.

Average loin fat has increased over 1946 by almost ⅛in.; the increase has been least marked in the 151-160lb. class.

All carcasses have a shoulder-fat measurement exceeding the optimum by approximately ⅜in. Though the optimum standard for loin fat for the 1950 baconer competition was increased by 1/16in. in each weight range, the 121-150lb. group exceeds the optimum by more than ⅛in., while the 151-170lb. group exceeds it by more than 3/16in.

Belly Thickness

The calculations made on the allocation of points for belly thickness are aimed to show whether the judges' estimates of this character are influenced by some other carcass character. The number of porkers included having loin-fat points between 1 and 5 is too small to be of any significance. However, the baconers within the 1-7 range of loin-fat points score higher for belly thickness than do those in the 8-14 points group and generally also than those in the 15-20 points group. This is an indication that proper allowance is not being made for the degree of fatness.

Another significant point is that with an increase in weight in both porkers and baconers the points for belly thickness increase also, approaching the maximum of 5 at heavy weights. This means that a carcass having low points for loin fat will score higher for belly thickness than a carcass of lighter weight having high points for loin fat. The degree of fatness and weight of the carcass are therefore two factors to be considered in ensuring fairer points allocation for belly thickness, as far as this can be appraised by handling.

Hams

New Zealand pigs are not as weak in the hams (15 points were allotted under this heading) as in characters already dealt with. However, there is room for improvement and when efforts are made to produce longer carcasses vigilance is necessary if hams are not to suffer.

TABLE 5—AVERAGE PORKER BACKFAT MEASUREMENTS, 1946

Weight range (lb.)	60-75	76-90	91-105	106-120
Number of pigs	339	453	276	84
Shoulder fat (1/16in.)	11.6	13.9	16.5	18.1
Optimum (1/16in.)	13-14	14-15	15-16	16-17
Loin fat (1/16in.)	6.5	7.7	9.7	10.7
Optimum (1/16in.)	8	9	10	11

TABLE 6—AVERAGE PORKER BACKFAT MEASUREMENTS, 1950

Weight range (lb.)	60-75	76-90	91-105	106-120
Number of pigs	456	1,056	651	366
Shoulder fat (1/16in.)	13.04	14.44	16.03	19.3
Optimum (1/16in.)	13-14	14-15	15-16	16-17
Loin fat (1/16in.)	7.05	7.98	9.07	10.81
Optimum (1/16in.)	8	9	10	11

TABLE 7—AVERAGE BACONER BACKFAT MEASUREMENTS, 1946

Weight range (lb.)	121-130	131-140	141-150	151-160	161-170
Number of pigs	201	258	284	161	127
Shoulder fat (1/16in.)	25.0	26.3	27.0	28.1	29.6
Optimum (1/16in.)	20-23	21-24	22-25	23-26	24-27
Loin fat (1/16in.)	13.7	14.8	16.0	18.3	19.0
Optimum (1/16in.)	12.0	13.0	14.0	15.0	16.0

TABLE 8—AVERAGE BACONER BACKFAT MEASUREMENTS, 1950

Weight range (lb.)	121-130	131-140	141-150	151-160	161-170
Number of pigs	397	566	757	615	398
Shoulder fat (1/16in.)	27.38	28.91	29.63	31.14	32.78
Optimum (1/16in.)	20-23	21-24	22-25	23-26	24-27
Loin fat (1/16in.)	15.65	16.54	17.59	19.09	20.52
Optimum (1/16in.)	13.0	14.0	15.0	16.0	17.0

Shoulders

Ten points were allotted for shoulders. The fore-end, particularly in baconers, should be proportionately light to give a good balance of side and an even roll of bacon. Most of the bacon going into the local trade is rolled by the curer and it is noticeable that heavy fore-ends (thickness of shoulder muscle and fat) contribute more to lack of balance observed in many of the rolls than does depth of chest. Some lightening of the shoulder to give a better balance to the carcass is still necessary.

Development of Loin

Ten points were allotted for development of loin. The judging of development of loin is an attempt to assess the proportion of lean meat in the carcass. What is looked for is flat back and flat sides in contrast to the round, barrel-type carcass which has been found to accompany excessive fat disposition. There is room for improvement in this character, and since

TABLE 9—AVERAGE POINTS FOR BELLY THICKNESS, PORKERS, 1950

Weight range (lb.) ..	60-70			71-80			81-90			91-100			101-110			111-120		
Loin-fat points	1-5	6-10	11-15	1-5	6-10	11-15	1-5	6-10	11-15	1-5	6-10	11-15	1-5	6-10	11-15	1-5	6-10	11-15
Number of pigs	—	29	149	2	62	368	1	59	470	4	37	342	2	39	195	8	41	103
Average points for belly thickness	—	3.5	4.15	4.0	4.05	4.18	5	4.15	4.53	4.0	4.55	4.65	5	4.65	4.78	5	4.65	4.74

TABLE 10—AVERAGE POINTS FOR BELLY THICKNESS, BACONERS, 1950

Weight range (lb.)	121-130			131-140			141-150			151-160			161-170		
Loin-fat points	1-7	8-14	15-20	1-7	8-14	15-20	1-7	8-14	15-20	1-7	8-14	15-20	1-7	8-14	15-20
Number of pigs	44	89	122	71	115	191	94	119	231	85	129	137	74	81	79
Average points for belly thickness ..	4.65	4.5	4.74	4.8	4.73	4.78	4.85	4.74	4.87	4.9	4.89	4.89	4.99	4.9	4.95

the body conformation shows up fairly well in the live pig, it should be possible to make some further progress by selection on the hoof.

Marketing Points

Possible marketing points were: Porkers, 10; baconers, 5.

A good, clean, bright skin without pigmentation, retained hair, seedy cut, bruises, scratches, or any other blemish is required. With the increasing use of Large White boars some improvement is being shown, but there is still evidence, such as bruising, of careless handling.

As after singeing baconers have an improved and more uniform appearance, certain defects such as pigmentation are of less moment in baconers, and for that reason fewer marketing points are allotted for baconers than for porkers.

Summary of Competition Results

The competitions, and comparisons between 1950 and 1946 results, may be summarised as follows:—

Length: In proportion to weight both porker and baconer carcasses were shorter.

Balance of side: This character becomes progressively poorer with increase in weight. Bacon pigs require improvement in this respect.

Backfat: Both shoulder and loin fat have increased in all pigs. However, the loin fat of the lighter porkers is still below the optimum; baconers have become more excessively fat in all weight ranges. The increase in shoulder fat becomes important in carcasses of over 90lb. The lack of any premium for quality undoubtedly has been responsible for the trend toward the production of fatter, shorter pigs at all weights than were entered in the 1946 competitions.

Points for belly thickness: Results show that a fair allocation of points for this character has not yet been achieved; no proper allowance is being made for weight and degree of fatness of carcasses. Added to this, the fact that thickness of belly is influenced much more by fasting and resting immediately before slaughter than by either breeding or feeding and that the points awarded in a competition are no guide to a breeder in selection throws considerable doubt on the value of retaining judging of belly thickness in competition work.

Decline in Quality

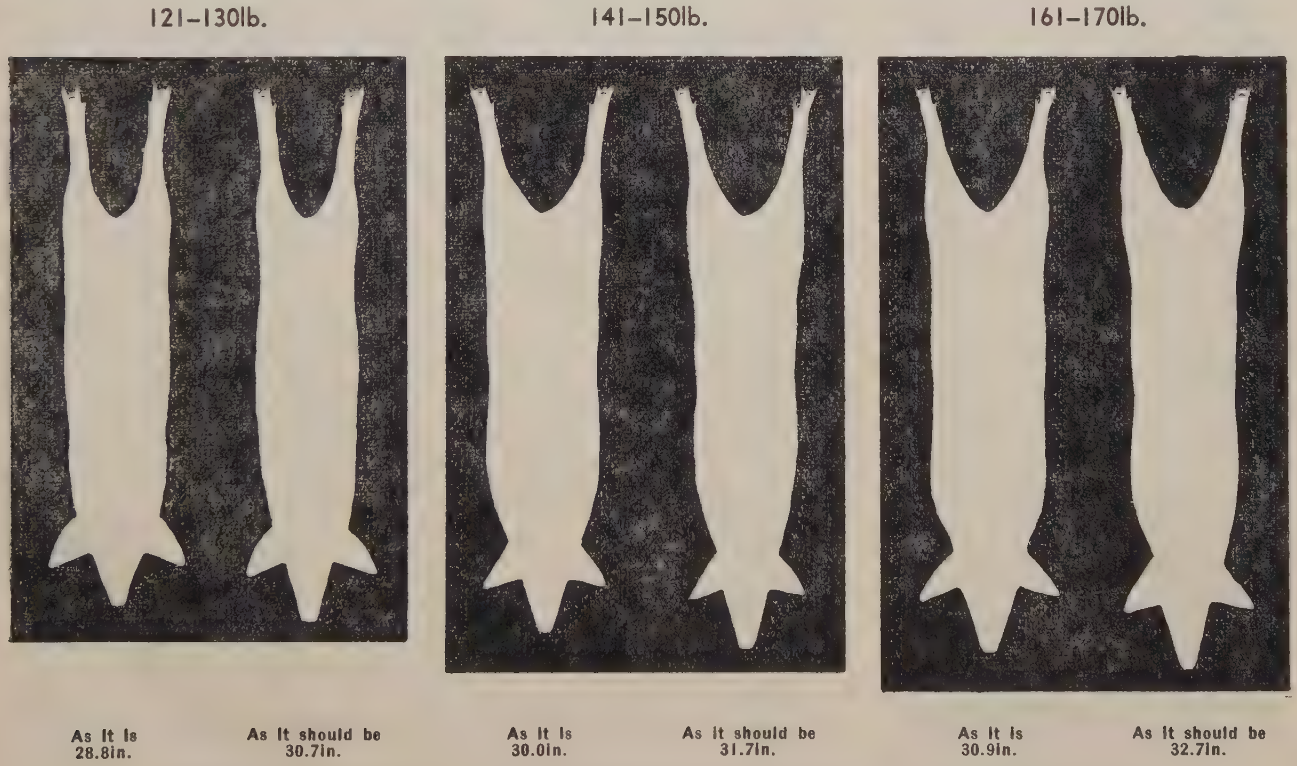
The increase in the number of carcasses in the competition from 3480 in 1946 to 5640 in 1950 would indicate that selection has not been as critical as in 1946 and this, in addition to the lack of incentive to produce high-quality carcasses, has possibly contributed to the decline in general quality.

Two major factors contribute to carcass quality: Breeding and feeding. Unsatisfactory length and balance of side can only be overcome by applying thoroughly more careful methods of selection and breeding. The average New Zealand pig is so far below the optimum in length that it should be possible to make considerable progress with the aid of carcass-quality information obtainable from the carcass-quality scheme. Ultimately, a testing-station system will be required to assist breeders in their selection but, meantime, the information obtainable from the carcass-quality scheme and competitions if used can assist the industry toward the production of better-type pigs.

Producers of the better-type pigs in competitions today are largely those who have benefited from information obtained on the performance of certain strains, and until the majority of pig raisers have appreciated this fact and followed the example of those producers it would be premature for breeders to undertake the costly methods of improvement inherent in a testing-station system.

Controlled Feeding

Backfat thickness can be controlled by careful feeding, the essential points being to feed pigs well so that they grow at their maximum rate up to 16 weeks of age and then to restrict the feed gradually so that in the fattening stage the deposition of fat is controlled to suit the particular type of pig and the ideal finish at the weight desired is obtained. The ideal weights for porkers are 70 to 90lb. dressed weight, and up to this stage it is difficult to over-fatten the pig, as the rate of growth of muscle is relatively greater up to this stage. Baconers should be finished at about 145 to 150lb. dressed weight, and some restriction in feeding is necessary to get ideal finish on these pigs unless they


121–130lb.

As It Is 28.8in.

As It should be 30.7in.

141–150lb.

As It Is 30.0in.

As It should be 31.7in.

161–170lb.

As It Is 30.9in.

As It should be 32.7in.

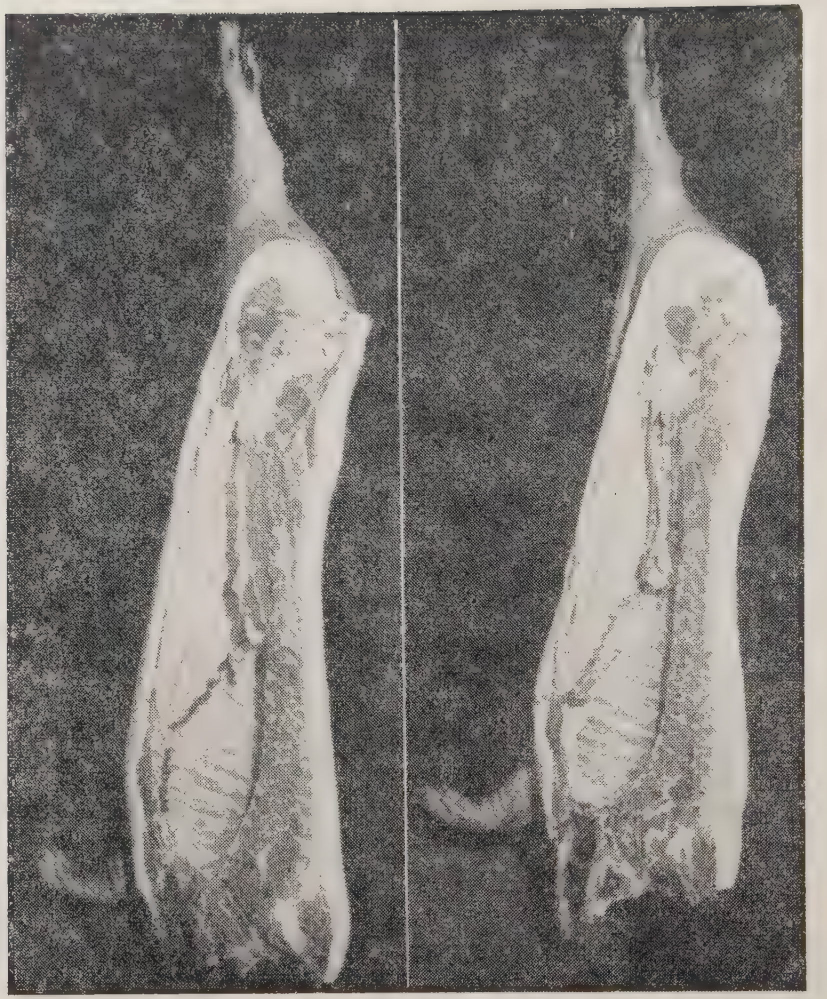
Diagram showing the extent to which New Zealand pigs fall short of the ideal length for weight.

are of a highly specialised bacon type, when they might reach the ideal finish at a little heavier weight and with little, if any, restriction in feeding.

Growth Rate

In the 1950 competitions there was included for the first time a section in which growth rate, up to a maximum of 100 points per team of 4 pigs, was combined with carcass quality in the final assessment. Because of the necessity for restricting feeding to avoid over-fatness in average New Zealand pigs, the coupling of growth rate with carcass quality gives a much more critical test of suitability of pigs for baconer production. From the farmer's point of view, though it is important to have a high standard of carcass quality so that demand for the product will be maintained, the product must be produced at a profit. To indicate how this critical test works the following table has been drawn up to include all teams in this section which scored 70 per cent. of points in total or for carcass only.

[*Sparrow Industrial Pictures Ltd. photo.*
Ideally balanced carcass.



[*Sparrow Industrial Pictures Ltd. photos.*
Good side (left) and bad side (right) from carcasses of the same dressed weight (155lb.). The measurements and points scored were:—

POSSIBLE POINTS		GOOD SIDE		BAD SIDE	
Length	20	32in. ..	19	30in. ..	11
Depth of side ..	5	12¾in. ..	5	12¾in. ..	2
Backfat, loin ..	20	1in. ..	20	1¼in. ..	9
Backfat, shoulder	10	1½in. ..	10	2¼in. ..	1
Total measurement points ..	55		54		23

TABLE 11—PERFORMANCE OF BEST TEAMS IN GROWTH-RATE SECTION

	Date of birth	Av. d. wt. gain per day lb.	Carcass points Points (max. 420)	Carcass points % of poss.	Total points Points (max. 520)	Total points % of poss.
Ruakura A.R.S.	2/12/49	.88	329	78	405	78
New Plymouth Boys' High School ..	25/6/49	.74	329	78	377	72.5
J. W. Wilson	25/10/49	.89	289	69	367	71
New Plymouth Boys' High School ..	1/8/49	.68	320	76	356	68
D. G. Bell	4/11/49	.72	309	74	353	68
R. Julian	13/11/49	.70	303	72	343	66
J. G. Fowell	22/11/49	.67	304	72	338	65
A. J. Dixon	20/9/49	.72	292	70	336	65
Risi Bros.	4/9/49	.65	306	73	336	65
Risi Bros.	15/6/49	.70	294	70	334	64
Greig Estate	17/8/49	.58	298	71	314	60

All these teams were Large White or by Large White sires. The teams placed 6th, 8th equal, and 10th were whey fed.

FACTORS INFLUENCING QUALITY OF PIP FRUIT

By C. E. BUSWELL, Horticultural Inspector, Department of Agriculture, Motueka.

WITH the importation of oranges and bananas approaching pre-war quantities, pip-fruit growers will need to make every endeavour to improve the quality of their produce if it is to hold a favourable position on local markets. Care in the handling of pip fruit during harvesting, grading, and packing will assist materially in ensuring that the fruit arrives on the market in a condition more attractive to the buyer, whose confidence in its quality is vital to the welfare of the industry.

[*Sparrow Industrial Pictures Ltd. photo.*

THE elimination as far as is practicable of small sizes of pip fruits is desirable, and, when pruning, some consideration can be given to this problem and the initial steps taken to deal with it. With the elimination of a large percentage of fruit buds when indications are for a heavy crop the following results will be achieved:—

The size of fruit will be improved without any appreciable crop reduction.

The increase in size of the fruit will make the crop more economical to harvest.

Thinning will be reduced to the one operation of breaking up bunches.

Foliage will be improved both in size of leaf and tone.

Russet blemish will be reduced.

The tree will develop its crop and at the same time produce fruit buds for the following year, tending toward more regular cropping.

Adequate leaf surface is vital to the production of quality fruit, and for this reason the tree must be maintained in a vigorous condition. The cutting out of the spurs, and fruiting on younger wood, improves both the size and quality of the fruit.

[*National Publicity Studios photo.*

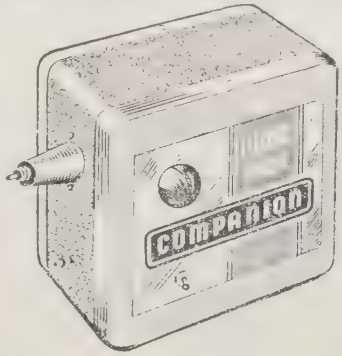
Careful handling of the fruit at this stage is essential. The pickers are shown placing the picking receptacles into the cases before releasing the canvas bottoms.

Immature Fruit

The practice of picking apple varieties too early is not to be commended. Even if the fruit does not shrivel, the flavour usually associated with each particular variety is not fully developed. Where large staffs are employed and varieties have gaps between harvesting dates the grower often faces the problem of having to decide whether he will have the staff idle for a few days or pick immature fruit. By carefully planning the season's activities the grower can reduce this gap considerably as well as improve the quality of his fruit. A considerably higher percentage of fancy-grade fruit, particularly in the coloured varieties, will more than compensate for any effort involved.

Over-anxiety to begin harvesting is likely to lead to difficulties. When the first variety is finished the grower often feels compelled to continue harvesting to keep staff employed. By starting later, when his earliest variety would be slightly more mature but still in prime condition for export, he would find probably that the succeeding varieties were ready by the time he came to deal with them. However, if a gap in harvesting dates still existed, case making and other incidental work could occupy the staff for a few days.

In the harvesting of pears the reverse of the situation as it relates to apples usually applies. Pears left on trees too long ripen too quickly when picked. They are difficult to transport to markets and are often mealy and tasteless. The Williams Bon Chretien variety is one which requires picking at the right stage of maturity if the magnificent flavour of this pear is to be appreciated. Maturing as it does



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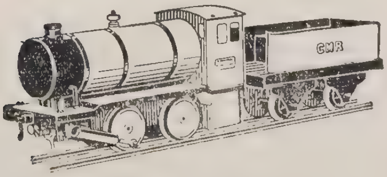

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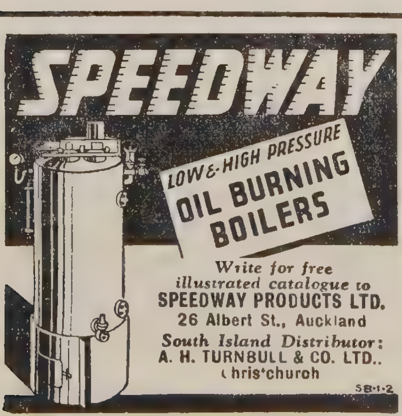
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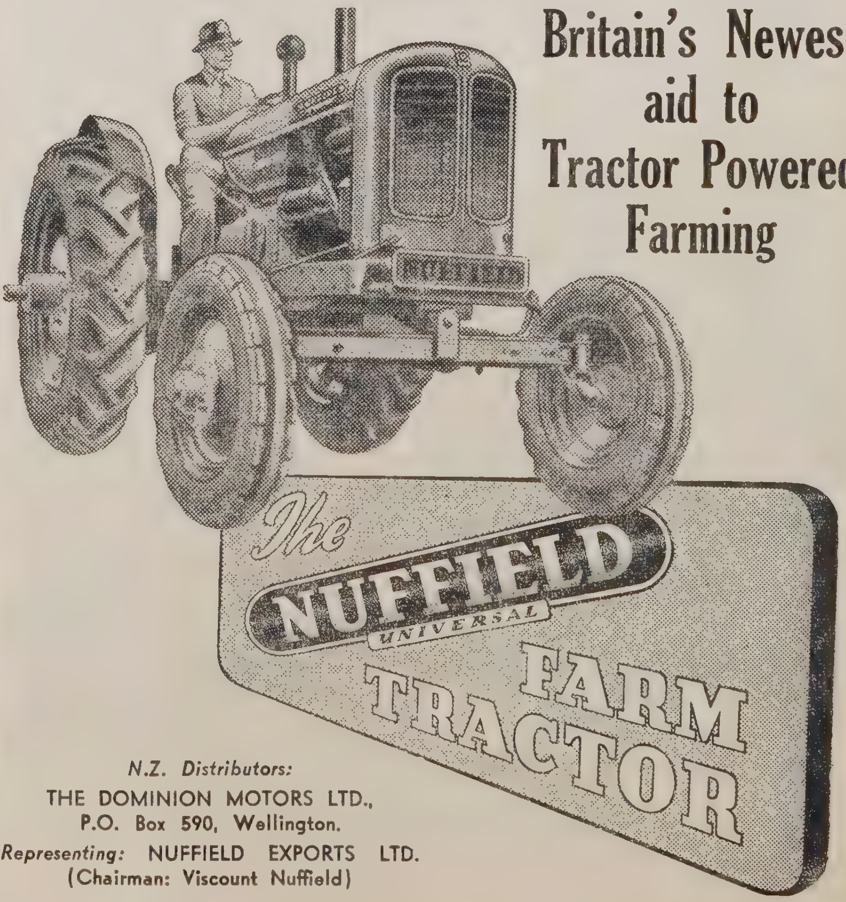
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[*Sparrow Industrial Pictures Ltd. photo.*

Cases lightly filled with fruit at this stage to avoid damage which occurs if they are over-filled.

in January (February in Otago), during the hottest period of the summer, this variety requires very speedy handling and dispatch. These pears should be picked and packed and reach an assembly depot within 24 hours.

Bruising during Picking

Instances have been quoted of record tallies in picking, some of which are double and treble the normal picking rates. Nothing is gained in setting such records if a large percentage of fruit is bruised and punctured. In fact such picking often results in a considerable loss to the grower. Steady picking, with the elimination of bruising, should be the grower's objective in training his staff.

Apples should not be pulled or plucked but picked with a backward rolling movement which parts the stem from the spur at the abscission ring. Fruit which is plucked or pulled often has the spur attached, which, if placed in a picking bag, punctures or bruises any fruit with which it comes in contact. Sometimes the stem may be torn from the apple, leaving an open wound, which, apart from providing an entry for fungi, detracts from the value of the fruit. Immature fruit is difficult to pick, as Nature has not intended the stem to part from the spur at this stage. Furthermore, when a spur is torn from a tree the bud which will produce fruit in the next season is also removed.

Apples should be placed, not dropped, into the picking receptacle, whether it is a bag, bucket, basket, or box. The method of emptying the picking bag or apron is important, as bruising may be caused by pouring apples into a container. The picker should place the picking bag in the container, release the canvas bottom, and then slowly straighten up, drawing the bag from the fruit. Be sure the case is not over-filled, otherwise bruising will occur when cases are stacked.

Stacking

When fruit is to remain stacked in the orchard for a short period it is important to level the ground to provide a good foundation for the stack. This will save loss of time and fruit which would occur if a stack capsized.

If it is intended to leave the stack out for some days, protection should be provided against the possibility of wet weather. After levelling the ground, sacks or old bags can be placed on it to keep cases clean. Three cases can be placed on one sack, and if stacked 6 tiers high, 100 sacks will enable 1800 cases to be stacked without the risk of the bottom row becoming coated with mud. Timber, straw, or cover crop also can be used to protect the bottom cases. Top cases require covering to prevent the fruit which is exposed from bleaching in the sun. The handiest and quickest method of covering is to place inverted cases on the stacks. In exposed situations, however, where wind is likely, the best method is one in which three lid pieces can be used effectively, the centre one overlapping the other

[*National Publicity Studios photo.*

A case packed to the correct height is shown in the illustration. Severe damage may occur to fruit on the lidding press unless the pack is crowned correctly.

Veterinary Services Council

●

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The Veterinary Services Council is providing up to fifteen bursaries to enable students to commence a four years' course in veterinary science at the Veterinary School, Sydney University, in 1951.

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(3) Allowance of £3 a week during the academic year.

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Applicants MUST have passed the Medical Intermediate Examination, or its equivalent in the required subjects—zoology, botany, physics, organic and inorganic chemistry. Preference will be given to candidates possessing experience with livestock. Bursars may be required to undertake approved practical training in New Zealand during the long vacation.

Continuation of the bursaries will be contingent on satisfactory reports from the Dean of the Faculty of Veterinary Science, Sydney. Bursars will require to enter into an agreement to return to New Zealand after graduation and serve in an approved veterinary capacity for a period of five years.

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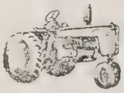

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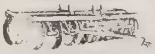

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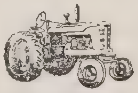

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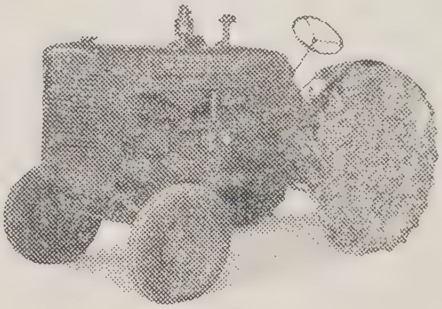

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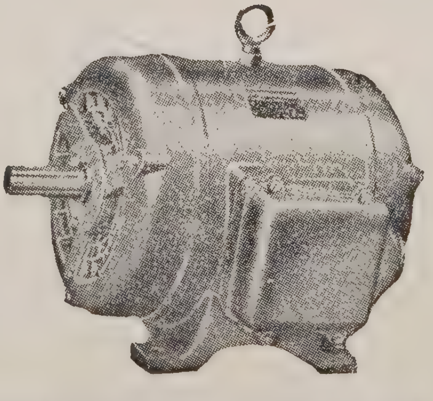

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two and tacked. Where fruit is stacked on slopes a small trench is necessary to turn the water.

In districts where heavy frosts are likely and freezing injury may occur it is not advisable to leave apples stacked in the orchard in late autumn. Such injury to fruit occurred in the 1949 season in Central Otago.

[*National Publicity Studios photo.*

Nails must be driven in straight, otherwise they may protrude either on the outside or inside of the case, making it dangerous to handle or damaging the fruit.

Transport to Shed

Nothing is gained by speedy transport to the shed if it means jolting and bruising. Cases should not be dumped on to the truck or trailer, as the apples are still unpacked and will bruise much more easily than later when they are packed and pocketed correctly. If the roadway through the orchard becomes hard and bumpy, a stroke with the discs every few days will improve it and lessen the chance of damage to fruit.

Grading

Much of the bruising which occurs is done while feeding the fruit through the grading machine, and to help to avoid this a sack tacked to the back top edge of the hopper is useful. Place the case of fruit on the shelf which runs along the back of most fruit-grader hoppers, draw the sack back over the case, hold the sack firmly to it and roll the case forward as though hinged on to the hopper. The case is now upside down and is carefully lifted from the fruit. Overloading the belts and bins is another source of bruising and it is not a time-saving factor. Also it is important to keep the bins clean and free from any refuse that will bruise and mark the fruit.

Packing

Cases should never be packed solely from fruit at the top of the bin, as some apples may have been at the bottom all day and become badly bruised and marked. Packing should always be done from the front of the bin, taking the apples right to the bottom of the bin, thus ensuring that each fruit is packed as nearly as possible in the order in which it arrives in the bin, so that it is exposed to bruising for the shortest possible time.

Packers with longer fingernails cut and mark apples considerably, and this should be avoided.

Cheek-to-cheek packing with the stems pointing to one end of the case, except the last apples in the layer which should have the calyces to the end, is the only way to achieve the uniformity of pockets so vitally necessary to a good firm pack. Packing in this way is no slower. The eyes select the apple and the hand picks it up and throws it into the paper so that the stem points away from the packer. With a little practice this is done automatically.

Slack packs and packs which are too high cause bruising, and for this reason a little time spent adjusting the grading machine until it sizes as perfectly as possible is a good insurance against these packing defects. Machines that grade by weight require careful watching, as the weight of fruit often varies in pickings from different parts of the orchard.

The packer should know when the first layer is packed whether the pack will come up to the correct height. The following details should be a guide:—

Apples with a diameter of 3in. are packed 100 count 3-2 across, 4-4 lengthwise, with 5 layers. Twenty fruits are placed in the bottom layer, with large pockets and packed fairly slack. The 113 pack has apples 2⅞in. in diameter and is packed 3-2, 5-4, 5 layers. Twenty-three fruits are placed in the bottom layer and the pockets are smaller and the pack a little tighter. This procedure may be followed down through the 3-2 packs, maintaining the correct height with 5 layers by tightening and reducing pockets as the size of the fruit decreases. This also applies to 3-3 or 2-2 packs; a tightening of pack and pocket from the large apples to the smaller. A good illustration of this tightening procedure is seen in the difference between 48 count 2-2, 3-3, 4 layers and 96 count 2-2, 6-6, 4 layers. Twice the number of apples are packed into the 96 count, maintaining the correct height, with the same number of layers as in the 48 count.

Packers should have a thorough knowledge of the grading regulations so that a check is kept on the standard of fruit coming from the grading table.

Lidding Press

Severe damage may occur to fruit on the lidding press unless the pack is crowned correctly. Badly packed apples can be bruised, crushed, and even cut in half in the nailing-up process, and the shed foreman must insist that the packers consolidate the pack by pressing the ends of each layer down with the flat of the hand. The pack should finish with the end rows nearly flush with the top of the case and rising to a crown in the centre.

In fitting the lid the foot lever should be pressed down slowly, otherwise much bruising may occur, particularly when the thick-bottomed case is used.

Nailing

Cleats should be soaked in a barrel or tub to eliminate splitting when nailing. Cleats that are cracked or split will part on the way to market; lids then come off and fruit is damaged or lost. Nails must be driven in straight, otherwise they may protrude either on the outside or the inside of the case. In neither position will the lid be held firmly and in addition such nails either make the cases dangerous to handle or damage the fruit inside.

Stacking Packed Cases

Packed cases should not be stacked more than 7 high, and where thick-bottomed cases are used this is often too high. With the bottom and sides of a case the same thickness, the pressure of the lidding press will find the weakest board, often causing a bulge in the side. It is impossible to stack such cases without exposing them to pressure, and the solution to this problem is the use of the thin-bottomed case.

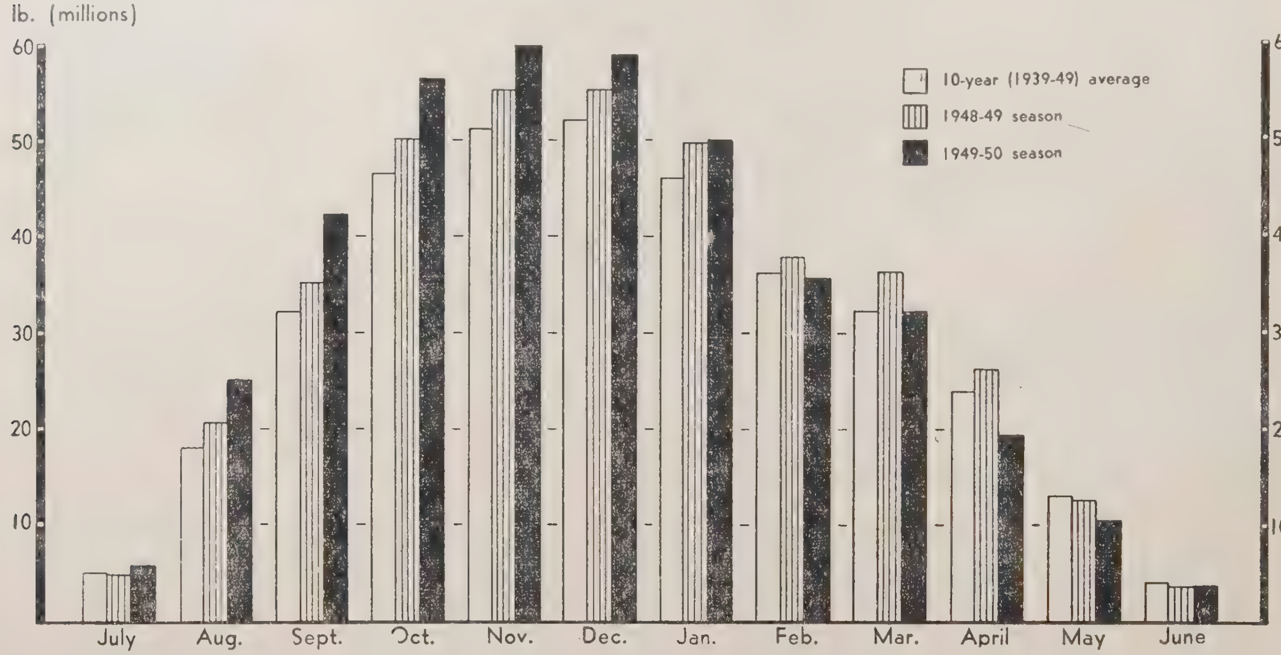
Importance of Appearance

In the sale of any commodity appearance is of primary importance, and therefore cases must be clean and as attractive as possible. Labelling, wire strapping, and branding must be done neatly to give the package a finished appearance, which is often a good indication that care also has been exercised in handling the contents.

ESTIMATED BUTTERFAT PRODUCTION FOR 1949-50 SEASON A RECORD

THE Extension Division of the Department of Agriculture gives the final estimate of total butterfat production for the season ended June 30, 1950, as 472,000,000lb. at the pail. The 1949-50 figure creates a new production record, exceeding the previous highest estimated figure of 467,000,000lb. in the 1940-41 season.

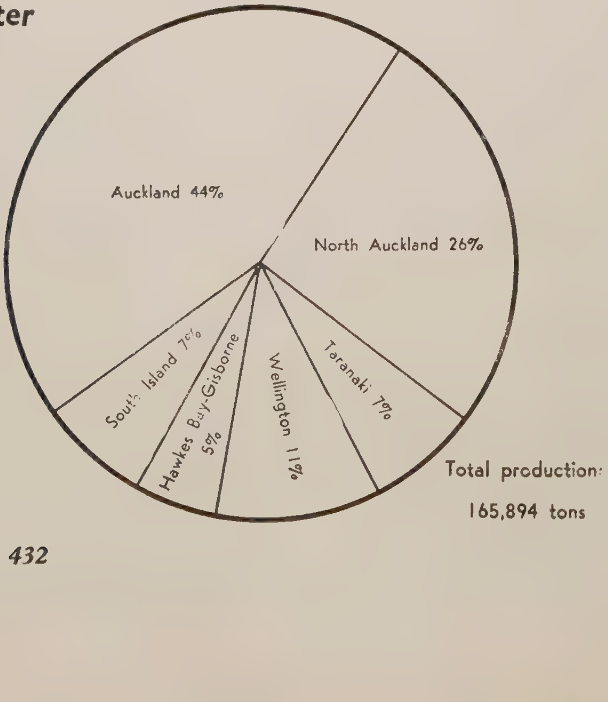
The amount of butterfat received at butter and cheese factories each month during the 1949-50 season, compared with the 1948-49 figures and the average of the last 10 years, is shown below:—



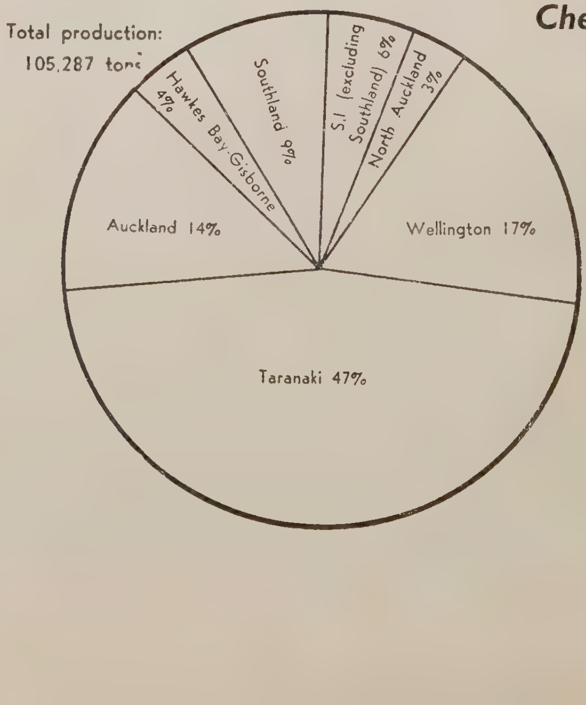
During the spring months of the 1949-50 season conditions generally were favourable in all districts and production was considerably in excess of the corresponding months during the previous season. However, the good start was not maintained and from January onward monthly production figures fell progressively below those of 1948-49, due largely to a prolonged dry spell in the main butter-producing districts of Northland and parts of the Auckland Province. Northland failed to recover from this setback and Auckland districts recovered only partially, although in other butter-producing areas production was maintained and showed small increases. Consequently butter production showed an increase of only 1.7 per cent. on the previous season. Cheese production, which came mainly from districts where a steady output was maintained, showed an over-all increase of 5.9 per cent. The total butterfat handled by factories making both butter and cheese was 2.7 per cent. more than in the 1948-49 season.

The following illustrates the contribution of the various districts to the total of butter and cheese manufactured during 1949-50.

Butter

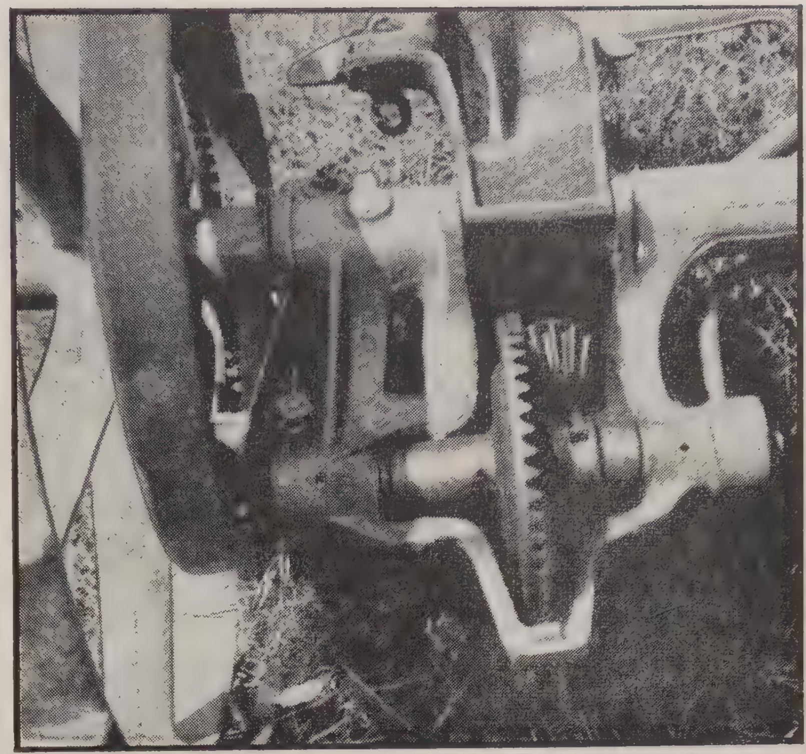


Cheese



Care of Farm Mower

THE farm mower, which is probably one of the most common implements on New Zealand farms, is a machine which requires regular attention to the sharpening of the knife as well as a thorough overhaul once a season if it is to work with maximum efficiency. This article by D. F. Scott, Farm Machinery Instructor, Department of Agriculture, Auckland, describes the main points to be watched by the user if he is to get the most satisfactory results from his machine.



The gearbox of an older type of mower shown open. Where all gears are not enclosed in an oil bath extra care is required with cleaning and lubricating.

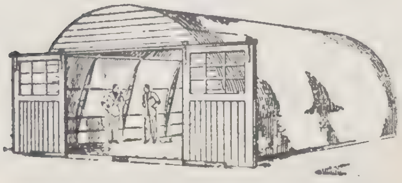
THE bodies of the first motor-cars were adaptations of the horse-drawn buggy, using an engine instead of a horse for motive power. As time went on they gradually changed until the body of the modern car is altogether different from the prototype. Similarly, the mower, which is being adapted to the tractor instead of the horse, is undergoing changes which may not yet be finalised. The first tractor mower was simply a horse mower drawn by a tractor. Later the trailer mower was driven from the power take-off to enable the blade to be driven at high speeds independent of the ground speed, and later still came various forms of tractor-mounted mowers, some with cutter-bars in front of and some behind the rear wheels of the tractor. Some of these mowers are fitted with either one or two castor wheels, and cutter-bar lengths vary from 4ft. 6in. to 7ft. The main details of the cutting mechanism of these machines are similar, so that with only a few exceptions the maintenance is the same as that required for the horse mower.

A mower in bad repair means up to 35 per cent. increased draught, loss of time through having to clear blockages, and a poor job done, so time spent on overhaul and repairs during the off season will save valuable time at haymaking later. A mower in good condition should have only a very slight side draught, but once the knife becomes blunt or the cutting mechanism becomes defective in some way the side draught increases enormously. With the horse mower it was most necessary to keep the cutter-bar in good order to make the job as light as possible for the horses, but there is a tendency with power-driven machines for the operator to neglect the condition of the cutting mechanism and when the going gets hard merely to open the throttle an extra nick and carry on, with the result that the very heavy side draught on the cutter-bar is likely to strain or break the yoke casting at the head of the cutter-bar. Power mowers which have been damaged in this way are quite common and the result is that the cutter-bar lags behind its correct position and also the pitman rod and knife run out of line.

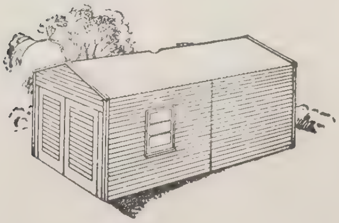
Tractor-mounted mower, showing power take-off shields, the linkage for raising and lowering the cutter-bar, the balance spring, and the means of adjusting its tension.

Sharpening the Knife

A dull or improperly ground knife causes ragged cutting, rapid wear, and extremely heavy draught. The quickest and easiest way to sharpen the knife is on a power-driven emery wheel. A specially shaped stone is available for the job and this should be dressed periodically with a dressing tool to preserve its correct shape. There are also available hand-driven grinders which can be clamped on to the wheel of the mower and are so designed that the stone moves up and down the cutting edges of the knife, which is held in position by a clamp. Another very convenient way to sharpen the knife is to use one of the specially shaped emery wheels mounted on the end of a flexible shaft. Although a file can be used for the job, the steel of the section is so hard that a new file does not last long. Whichever way the sections are sharpened it will be necessary to remove the feathered edge, which will damage the cutting surfaces once the knife is replaced in the mower and



SIZES: 16ft. wide x 24ft., 30ft., 36ft., 42ft., 48ft., etc.



Sizes: 8ft. x 8ft., 8ft. x 16ft., 8ft. x 24ft., etc. 10ft. x 10ft., 10ft. x 20ft., 10ft. x 30ft., etc. 20ft. x 20ft., 20ft. x 30ft, 20ft. x 40ft., etc.

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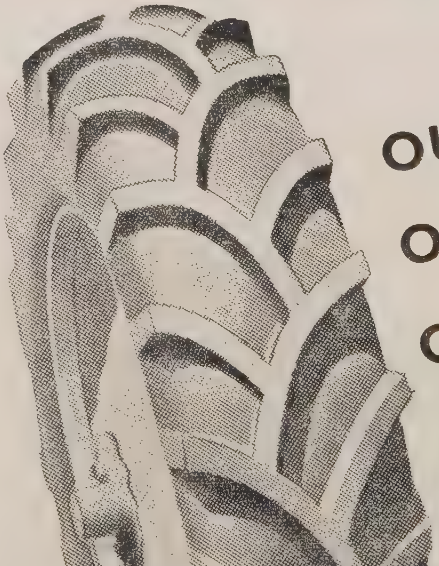

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comes into close contact with the ledger plates.

Points to Watch

Points to watch when sharpening mower knives are as follows:—

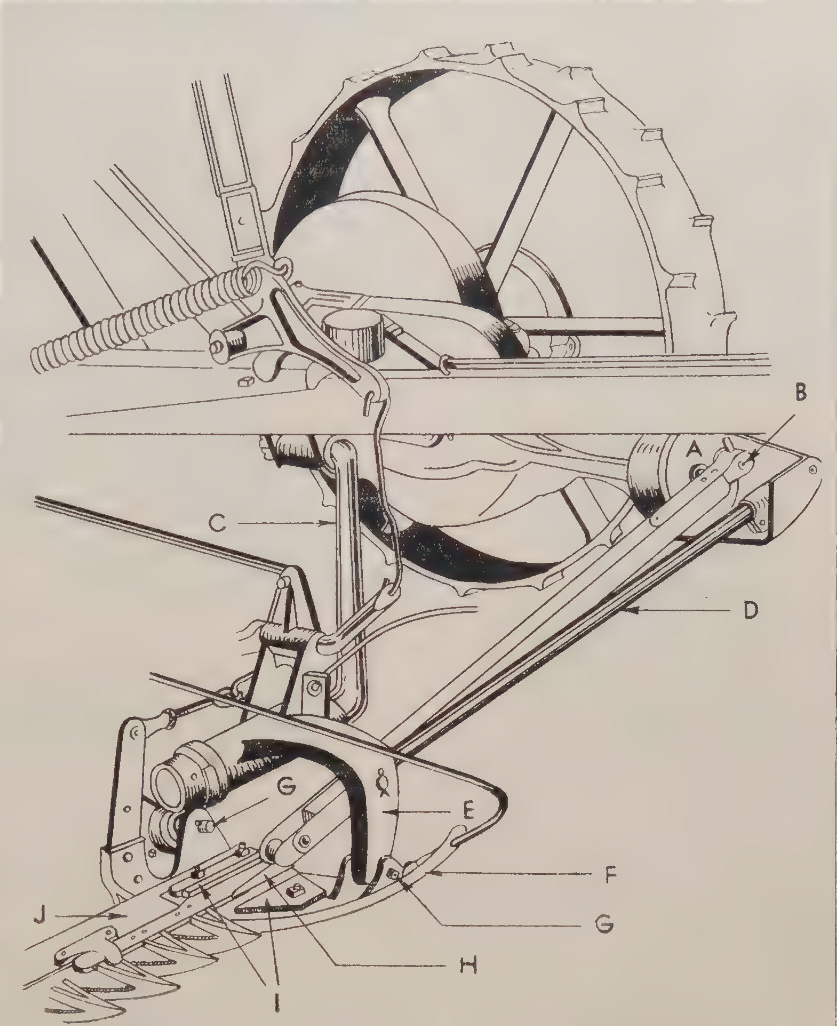
1. Maintain the original width of bevel. A narrow, blunt bevel does not cut well, and a wide, keen bevel is too easily nicked in use.
2. Maintain the original angle of shear. Try to grind the new cutting edge parallel to the old one.
3. Do not overheat the metal and draw the temper. To guard against this it is necessary to keep the section moving on the stone and not to apply too much pressure.

Any sections that are badly worn or chipped should be replaced. The knife can be held in a vice and the old section removed by cutting the rivets with a cold chisel. The practice of levering the old section off is inclined to distort the rivet holes in the knife bar. When riveting the new section on place the back of the knife on an anvil and swell the rivet with a few heavy blows and then round off the end. Do not overdo the rounding off and spread the head of the rivet, as this merely weakens it. With the older American type of mower it is better to buy a new knife rather than to replace all the sections on the old one. However, with the new English models the difference in price is too great. The knife should be examined periodically for loose rivets, especially in the knife head, where there is more vibration and wear.

Cutter-bar Parts

Sharpening the knife has little effect if ledger plates are in bad condition. Ledger plates, which are replaceable hard steel plates with serrated edges and which fit on to each finger to form the cutting edge, are not found on later British models imported to this country. Instead, the finger is made of a harder steel and has a non-replaceable smooth cutting edge. It is stated that this type has been used in England for a number of years and has been found quite satisfactory there.

Ledger plates which are worn smooth or round on the surface should be replaced. The finger should be held firmly and the rivet punched out. When the new plate is being fitted make sure it fits well into its position. It may be necessary to grind a little off the plate to do this. When the new plate has been riveted into place make sure that none of the countersunk rivet head projects above the surface of the plate. After all the ledger plates have been inspected the fingers must be adjusted so that the ledger plate surfaces are in line. A piece of light cord can be stretched across the surfaces of all the ledger plates to check the alignment and the fingers can be bent up or down by hammering the thick part of the fingers or packed with thin shims to raise or lower them. The knife clips should be hammered down so that there is about 1/32in. between the clip and the knife and the wear plates are slid forward to force the points of the knife sections down on to the ledger plates. Adjust the wear plates so that they do not bind but just have a working clearance.



Names of mower parts. A—Flywheel. B—Crank pin. C—Push bar. D—Tie bar. E—Yoke. F—Inner shoe. G—Hinge pins. H—Knife head. I—Knife-head guides. J—Cutter-bar

Before hammering down knife clips remove the knife from under the clip, but slide it back to check the clearance of each clip. It is important that the sections should rest square, level, and hard down on the ledger plate, and it may be necessary again at this point to raise or lower slightly, individual fingers by hammering or by using a piece of pipe as a lever.

If the knife-head guides are allowed to get worn, excessive vibration and chattering of the knife head occurs and this is likely to be the cause of a broken pitman. The knife-head guides can be adjusted by removing shims from beneath them so that there is only a good working clearance between the knife heads and the guides. If a knife is bent, it can be straightened by hammering it on a flat surface. A bent knife will bind and so increase the wear and also the friction. The knife should be carefully inspected for bends, flatwise or edgewise.

Fitting New Fingers

When fitting new fingers to the cutter-bar make sure that the wings of the finger each come into contact with a wing on the two neighbouring fingers. These wings ensure that the finger is held firmly in its correct position. If the wing is too long, a little should be ground off it, or if it is too short, it can be drawn out by hammering it on an anvil. Adjustable skids on both the inner and outer shoes will become worn in time, but these can be built up by welding or replaced.

The Lead Angle

The cutter-bar when not cutting and with the mower at rest does not project exactly at right angles to the path of the mower. A small amount of

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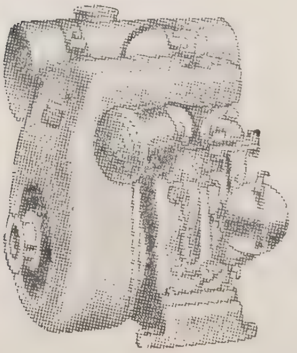

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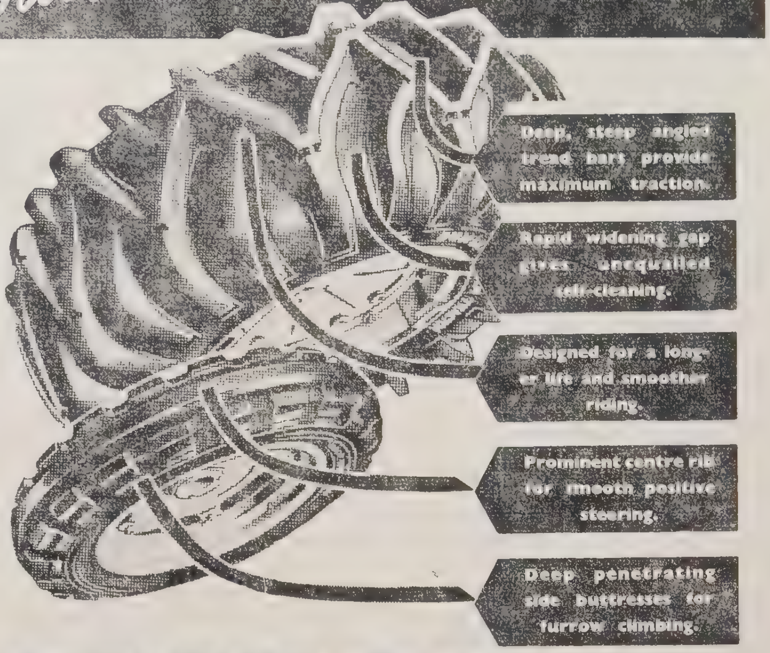

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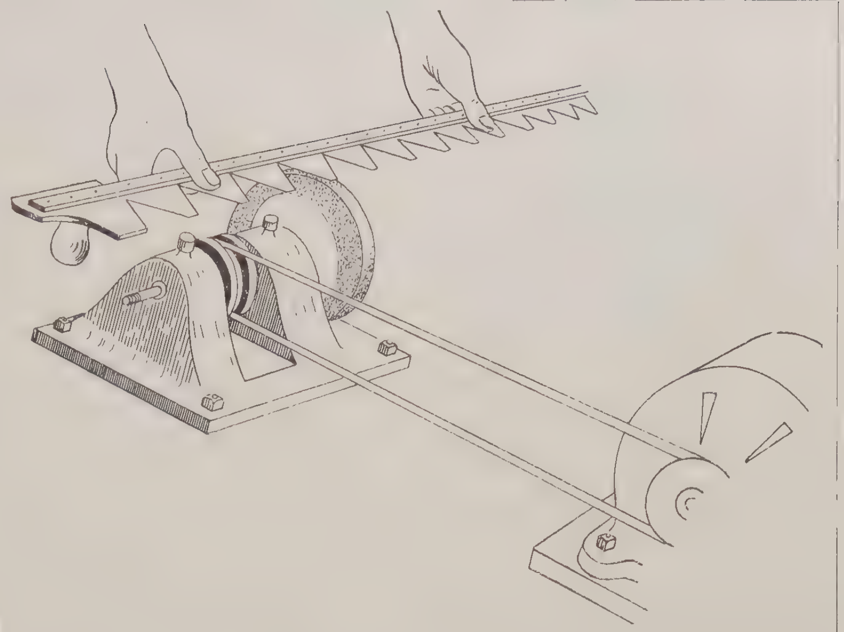
lead is applied so that the outside end of the cutter-bar is slightly ahead of the inside end. This lead is approximately ¼in. for every foot of length of the cutter-bar; that is, for a 4ft. 6in. bar there would be about 1⅛in. lead and for a 6ft. bar about 1½in. As the mower becomes worn this lead will decrease so that there will probably be a lag and this will also mean that the pitman rod and the knife are not in the straight line which is required when the mower is at work. This lag is very often due to worn hinge pins and these can be built up or replaced. On some mowers the rear hinge pin is fitted with an adjustable bush, or the lead can be altered by adjusting the lengths of the push and tie rods. To check the lead of the cutter-bar set up the mower in the cutting position on a flat piece of ground. If it is a horse mower, raise the pole and support it in the cutting position, that is, about 32in. above the ground, and pull back on the cutter-bar to take up any slack. Tie a string to the head of the pitman rod and run it out over the knife, keeping it parallel to the pitman. Then check the lead angle.



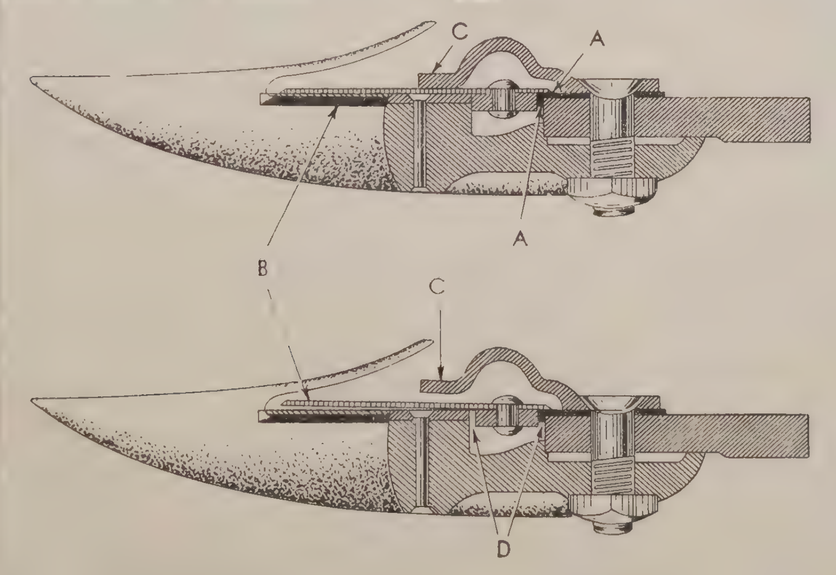
Although this grinder is shown driven from an electric motor, a machine of this type can be conveniently mounted on the tractor and driven from the belt pulley.

Register

The register should be adjusted so that at the end of each stroke the centre of each section of the knife should coincide with the centre of the finger. The main thing that determines the register is the length of the pitman rod. The pitman may have been replaced by one that is not the correct length or perhaps it is of the metal type which is adjustable in length and requires adjusting. The register can also be altered by lengthening or shortening the tie bars and shifting the yoke washers.

Lubrication

Lubrication or the lack of it is one of the chief factors determining the length of life of a mower. The wrist-pin bearing on the crank wheel should receive frequent lubrication while working. It is worth while stopping to grease it every 1½ hours. The gearbox should be filled to the level of the crank shaft with a good brand of gear oil. Care should be taken to see that no water is allowed to enter it. The oil should be drained out and replaced at least once a season. All the other lubrication points should receive daily attention, but on mowers with V-belt drives no oil should be allowed to get near the belts. A drop of oil applied to all the points in the usual complicated system of levers which raise and lower the cutter-bar will make for easier operation and reduce wear. The hinge pins should also be oiled.



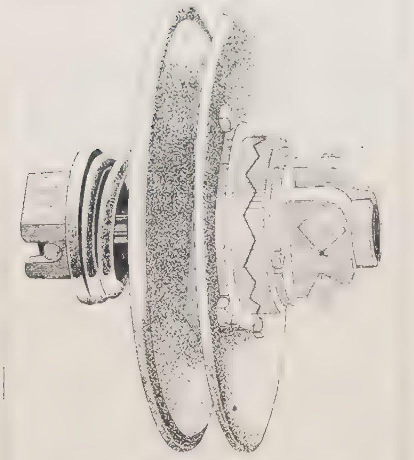
Correct (upper) and incorrect (lower) adjustments of knife clips and wear plates. A—Back of knife is held up and forward by hardened-steel wearing plates. B—To ensure a shear cut point of section must set on guard plate. C—Knife hold-down clip should almost touch the section. D—Set wearing plates ahead if knife bar fits too loosely in necks of guards.

Safety Release

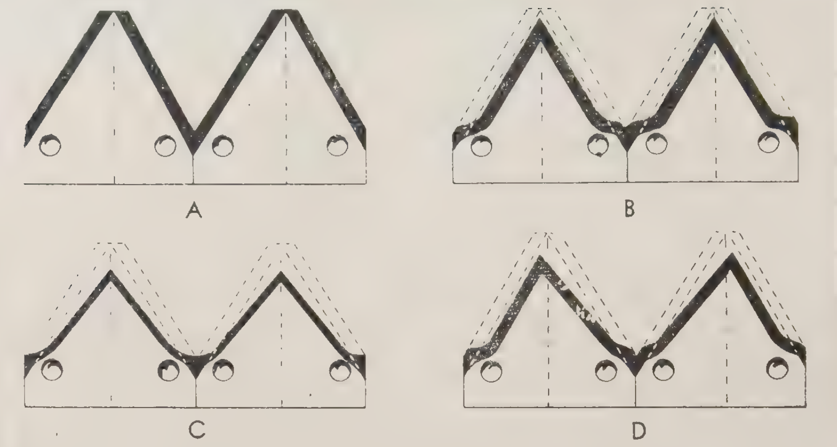
Most tractor-mounted mowers are fitted with a safety release which will allow the blade to swing back if it strikes an obstacle. The release should be adjusted so that it will release before any damage is done. Similarly on all power mowers the slip clutch should be adjusted so that it will slip as soon as any part becomes jammed or broken and before any further damage is done. The balance spring on the lifting mechanism should be correctly adjusted. This spring reduces the effort required to raise the knife and also reduces the weight on the outer shoe and thereby cuts down the draught. If this spring is adjusted too tightly, the outer shoe will tend to rise and will not follow the contour of the ground. On the other hand, if the spring does not have enough tension on it, the knife will be very difficult to raise. Most makes of mower provide in different ways for the various adjustments mentioned earlier, so that the best source of information on any machine is the operator's handbook, and this should be referred to when any trouble is experienced with the machine.

Worn Bearings

The machine should be inspected at intervals for worn bearings. These are easily detected when there is side play in any of the shafts that drive the knife. Worn bearings should be removed and new bearings should be carefully fitted in their place. The pinions and gears in the gearbox should also be examined to see that



The slip clutch should be adjusted to slip in cases of breakage or overload.



Right and wrong way to grind mower knives. Dotted lines show outlines of new sections. A—New sections with proper width of bevel and angle of shear. B—Sections properly ground. C—Sections ground with bevel too narrow and wrong angle of shear. D—Correct width of bevel but wrong angle of shear.

they are meshing to the required depth. These should be meshed fully, but not to such a depth that they will bind.

If the gears are unduly noisy after adjustment, it is an indication that they are meshed too deeply. The meshing of the gears can be adjusted by the fitting of washers between the bevel gear and the frame or by the adjustment of set screws for this purpose.

Wheels and Pawls

On the horse mower the pawls and pawl springs in the wheels should be inspected for wear and breakages. If they are allowed to become worn so that the pawls slip, the ratchets are damaged and are difficult to repair and expensive to replace, as they are a part of the wheel. Excessive end play in the wheels allows the pawls to lean outward and causes uneven wear to the pawl holders and the ratchets. The take-up washer on the outer end of the hub can be adjusted to reduce end play and if it is still excessive, steel washers can be added between the hub and the take-up washer.

The ratchet, pawls, and springs in the hand lift lever of the tractor mower should be examined regularly to make sure that they are operating easily and that the pawl and ratchet give a lock which cannot be shaken loose.

Storage

Where possible the mower should be placed under cover and the blade should be removed, sharpened, and covered with a film of thick oil. All shiny parts such as fingers and other cutter-bar parts should be covered with grease, and if the machine is mounted on rubber, it is a good idea to take the weight off the wheels by supporting the mower on blocks. Whether the cutter-bar is fixed in the vertical position or in the working position when the machine is stored, it is a source of possible injury unless the points of the fingers are shielded by wrapping them with bags or by placing a piece of wood in such a position as to cover all the points.

Knives should be stored out of the weather and in a place where they will not be a danger to man or animal.

Safety Precautions

The mower is undoubtedly a dangerous machine if not used properly, or if the user takes risks. The following points are worth noting:—

1. Never dismount while the mower is in gear or while the power take-off is running.
2. With a horse mower, never clear the cutter-bar with the hands or stand in front of the cutter-bar.
3. Always use power take-off shields and belt or chain covers and do not wear a scarf or long loose clothing.
4. Do not allow children or dogs in a paddock while it is being mown.

METEOROLOGICAL RECORDS FOR SEPTEMBER

Station	Height of station above M.S.L. (ft.)	Air temperatures in degrees (Fahrenheit)				Rainfall in inches					Bright sunshine hours
		Approx. mean	Difference from normal	Absolute maximum and minimum		Total fall	No. of days of rain	Difference from normal	Maximum fall		
				Maximum	Minimum				Amount	Date	
Kerikeri	201	53.4	+ 1.0	67.8	36.5	7.20	13		2.26	25	
Auckland	160	55.6	+ 1.1	67.2	42.3	2.31	12	— 1.67	0.71	4	172.5
Tauranga	10	52.8	+ 0.4	66.3	31.1	2.52	9	— 1.67	0.77	27	199.2
Ruakura	131	50.8	— 0.4	68.2	26.5	1.98	10	— 1.84	0.63	4	187.5
Rotorua	980	50.5	+ 1.0	69.0	29.0	1.97	11	— 2.92	0.78	4	161.1
Gisborne	12	52.6	+ 0.5	72.4	34.6	2.92	15	+ 0.34	0.48	30	172.7
New Plymouth ..	160	52.1	+ 0.6	63.9	35.7	6.23	8	+ 1.25	4.17	3	184.5
Napier	5	52.8	+ 1.0	72.3	34.1	1.96	10	— 0.05	0.49	12	184.5
Taihape	2157	47.4	+ 1.6	62.3	30.9	1.56	10	— 1.60	0.58	4	
Wanganui	72	52.2	+ 0.7	66.8	33.2	2.36	9	— 0.51	1.49	4	187.3
Palmerston North .	110	51.4	+ 1.1	68.2	31.0	2.35	8	— 0.73	0.87	4	163.5
Waingawa	350	50.0	+ 0.7	68.0	30.0	2.75	10	— 0.73	1.74	4	158.3
Wellington ..	415	50.4	+ 0.3	63.7	35.1	3.37	12	— 0.28	2.16	4	136.0
Nelson	24	51.7	+ 1.4	68.1	35.3	0.92	5	— 2.56	0.34	3	199.9
Blenheim	12	50.7	+ 0.0	72.9	28.4	0.58	3	— 1.74	0.28	4	185.6
Hokitika	12	48.6	+ 0.5	61.7	30.2	7.46	14	— 1.56	2.34	2	143.7
Hanmer Springs ..	1225	46.4	+ 0.5	70.4	22.0	3.25	10	— 1.34	1.25	4	136.9
Christchurch ..	22	49.7	+ 1.0	73.8	31.3	0.37	6	— 1.64	0.15	22	124.2
Ashburton	323	48.5	+ 1.5	73.0	28.0	0.97	5	— 1.59	0.29	22	120.1
Timaru	56	48.8	+ 1.0	75.0	28.8	1.36	6	— 0.55	0.56	21	126.7
Alexandra	520	49.8	+ 3.0	72.1	28.0	0.52	6	— 0.29	0.22	29	189.5
Taieri	80	47.9	+ 0.2	72.1	24.1	0.38	6	— 1.69	0.13	21	154.1
Invercargill ..	32	49.0	+ 2.1	67.0	27.0	1.63	15	— 1.80	0.50	10	126.7

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SUBSCRIPTION RENEWALS

Renewals of subscriptions to "The New Zealand Journal of Agriculture" should be paid to the nearest office of the Department of Agriculture. Subscribers can ensure continuity of delivery by paying their subscriptions as soon as possible after receiving their renewal notices and at least 1 month before the old subscription expires. When payment is made the renewal notice should accompany the subscription to ensure that the correct details are recorded.

Vacuum Control on the Milking Machine

By W. G. WHITTLESTON, Physical Chemist, Department of Agriculture Animal Research Station, Ruakura.

IT is over a year since a commercial form of the damped weighted vacuum regulator appeared on the market in New Zealand. Practical experience has demonstrated the value of this device, but through lack of understanding the regulator has on occasion been installed incorrectly. This article explains how the regulator works and how it should be installed.

THE job of the relief valve on a milking machine is to prevent the vacuum from rising too high when the pump is removing more air from the machine than there is flowing into it via the air admission holes, pulsators, etc. This extra air may be called the "reserve air"; that is, it is extra air which will be needed when cups are being changed or any accident such as slipping cups occurs. For efficient milking a stable vacuum which should be kept between 14 and 15in. of mercury is needed. A low vacuum means falling cups and slow milking; a high vacuum endangers the delicate tissues of the cow's udder. It is obvious that on a 4-cow plant the cups are changed four times during the milking of each cow. If the vacuum falls too much each time the cups are changed, there will be trouble due to falling cups. Three things can make the vacuum fall too much: A poor or slow pump, leaks, or a bad relief valve. A good pump and a poor relief valve are no better than a bad pump and a good relief valve. If the pump is running fast enough or is efficient enough to displace sufficient air to give a good reserve, this reserve must be accurately controlled.

What happens with a bad relief valve: Suppose the machine is fitted with a poor poppet-type valve and a set of cups slips; extra air comes into the machine and the vacuum falls. As the relief valve is insensitive, it still lets in air when the vacuum is down to 11in. and the cups fall off. This shows that a poor relief valve is like a leak in the plant; it reduces the effective capacity of the pump.

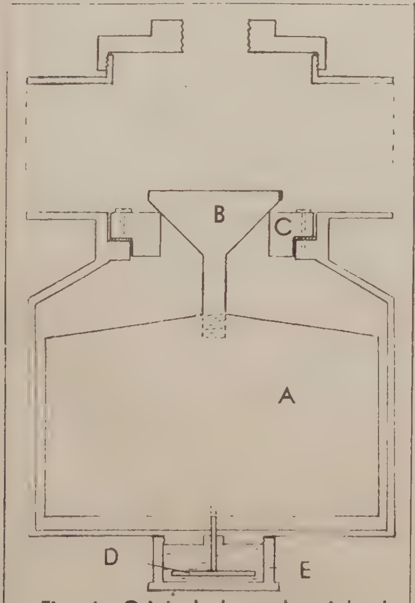


Fig. 1—Original damped weighted valve.

The action of a good relief valve: As soon as the vacuum falls by a small amount—perhaps only $\frac{1}{4}$in.—a good relief valve closes quickly and makes all of the reserve capacity of the pump available to hold the vacuum. This may save the cups from falling off and so disorganising the milking routine. In other words a good relief valve gives the plant more reserve capacity to cope with accidents.

Weighted Relief Valve

The only satisfactory relief valve is the weighted type. The weight remains constant and does not cause an increase in the force on the valve head when it moves to let air in, as happens in any spring valve. Of course, the fact that a valve is weighted does not necessarily mean that it is a good valve.

The original damped weighted valve is shown in Fig. 1. The metal weight A hangs from the head B, which seats in a removable ring-shaped seat C. Such a valve without a damping device is unstable. The small piston D fitted to the weight moves in the oil-filled cup E and damps the valve enough to make it stable. Though quite efficient such a valve is expensive and difficult to install.

Damped Weighted Valve: Reaction Compensated

To be effective the original valve had to be installed on the machine by cutting a piece out of the air line and sweating in the valve unit. This was necessary because if the valve is connected to the machine through a length of tubing, it loses its sensitivity due to the resistance of the rubber tube. However, to be convenient for farmers the relief valve should be capable of being fitted by a rubber tube. The new valve to be described overcomes the difficulty and at the same time is stabilised by damping.

A diagram of the valve or regulator is shown in Fig. 2. The main moulding 1 is held to a wall or other solid structure by the flange 2. A threaded cover 3 screws into the main moulding and encases the weight 8, which is enclosed in the plastic case 7. The bottom of this case is specially shaped to give a "reaction" valve seat 9 and 10 which rests on the air inlet tube 4. Air entering the valve passes through the screen 5 and leaves by the tube 6. The movement of the weight is damped by the piston ring 11 fitting snugly into the highly polished interior of the cover 3.

Action of Valve

The action of the valve is as follows:—

As the tube 6 is connected to the milking machine by a length of rubber tube, the vacuum in the machine is applied inside the cover. This means that the pressure of the atmosphere acts upward on the valve seat at 10 and tries to lift the weight. If the valve is set to open at 15in. as soon as the vacuum has reached this level the force pushing up on the weight just manages to lift it and some air flows into the machine past the seat 9. If only a small amount of air passes, the force downward of the weight remains constant.

But suppose that the cups are hung up in two bails of a four-bail plant: A fair volume of reserve air now tries to come into the valve and the vacuum in the machine tries to rise. This lifts the weight and more air flows in. This extra air flows out of the valve down the rubber tube and in so doing causes the vacuum in the

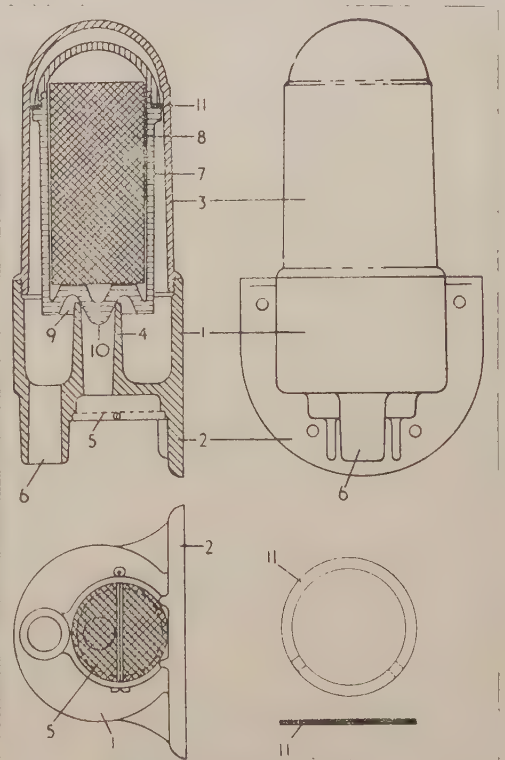
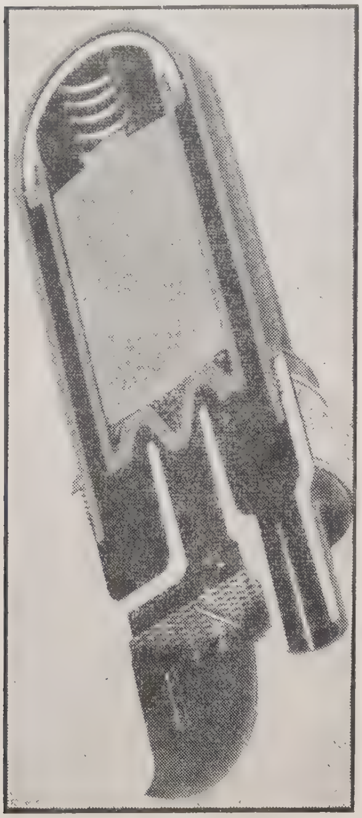


Fig. 2—Diagram of regulator.



[Times Photo Engraving Co. Ltd. photo.

Fig. 3—Cross-section of plastic relief valve.

valve to be a little lower than the vacuum in the machine, due to the resistance of the rubber tube. With an ordinary valve this effect causes a loss in sensitivity. In the case of the compensated valve there is no loss. As the air flow increases the air blows against the specially shaped valve and gives the weight an extra lift. This means that the valve will stay open for a slightly lower vacuum than is needed to open it at first. By specially designing the seat the extra push due to the air blowing on the valve exactly compensates for the difference in vacuum caused by the air flowing down the rubber tube. This means that the regulator operates correctly only if fitted with the correct length and size of rubber tubing connecting to the machine by a nozzle or inlet tube which does not obstruct the air flow.

Vertical Mounting

The special seat also has the effect of keeping the valve centred properly, even if it is not mounted quite vertically, though it is recommended that the valve be mounted as near the vertical as possible.

As vacuum control is needed in the milk line, it is recommended that this sensitive regulator be connected to the vacuum tank or as near as possible to the tank on the air line. It should be screwed (not too tightly) to a firm wall or other support above the level of the point to which connection is made, so that the length of rubber supplied with it runs downhill all the way from the regulator to the machine. The rubber supplied must not be shortened or added to. Because of the large volumes of air passing through it, the regulator should be fitted in the separator room where possible to avoid the trapping of cow hair, dust, and other possible contaminating materials.

Faults in Installation of Regulator

The following faults may occur when installing the regulator:—

1. Shortening of the rubber connecting tube: This causes the valve to be over-compensated and so to be slightly unstable.

2. Using rubber tube which is too long: This causes a loss in sensitivity.

3. Having a connector on the air pipe or vacuum tank which is too small: This will reduce the sensitivity and may cause the valve to oscillate; a good means of connecting the regulator to the machine is by the use of ⅝in. milk dropper connector. Old gauge fittings and some types of relief valve fitting must not be used.

4. Setting up the regulator off the straight: This reduces the sensitivity.

5. Mounting the regulator on a support which is vibrated by some part of the machine drive: This causes chattering and wear.

6. Mounting the regulator on the air line at the far end from the releaser: In this position it collects dirt and attempts to compensate for the pulsator fluctuations.

If the compensated regulator is fitted correctly to a machine, its accuracy is such that it may be used to check the gauge. Its sensitivity is such that it will respond immediately to extra drains of the reserve air and so conserve useful pump capacity. The use of this instrument enables the pump to be run more slowly and thus more economically for the same effective reserve of air as will be obtained with a poor regulator and a faster pump.

Little Maintenance Needed

Farmers are urged to see that when a vacuum regulator is installed care is taken to avoid the faults mentioned. Once installed correctly the device needs no attention other than to be carefully taken to pieces occasionally so that dust can be cleaned off the valve and seat with a small dry brush. How often this is done depends entirely on how dusty the air is where the regulator is working.

If the regulator is installed vertically on a solid wall and connected by the tubing supplied with it to a ⅝in. milk inlet nipple fitted as near as possible to the vacuum tank on the air line side, it will give precise and reliable vacuum control. With a correctly adjusted leak-free machine evacuated by a pump running at the correct speed such a regulator will be found to improve the efficiency of the plant.

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RADIO BROADCASTS

THE following talk will be given to farmers from Station 1YA Auckland at 7.15 p.m.:

December 6—"Haymaking," by J. E. Bell, Fields Superintendent, Extension Division, Department of Agriculture, Auckland.

The following talk to farmers will be broadcast from Station 1XH Hamilton at 7.30 p.m.:-

December 7—"Honey," by C. R. Paterson, Apiary Instructor, Department of Agriculture, Hamilton.

A radio talk will be given to farmers from Station 1YZ Rotorua at 7.15 p.m.:

December 14—"Summer Feeding of Stock," by E. R. Marryatt, Fields Instructor, Department of Agriculture, Whakatane.

Other talks are given from 1YA Auckland on Tuesdays at 12.35 p.m., 2YZ Napier on Tuesdays at 7.10 p.m., 2YA Wellington on Thursdays at 12.35 p.m., 3YA Christchurch on Mondays at 12.20 p.m., and 4YA Dunedin on Thursdays at 12.35 p.m.

Pig Broadcasts

Under the auspices of District Pig Councils broadcasts will be delivered as follows:—

Auckland—1YA, on December 19, at 12.35 p.m., discussion on problems of the care of pigs in summer, conducted by H. E. Clark, Supervisor, Auckland District Pig Council.

Hamilton—1XH, on December 5, at 7.30 p.m., "Is Meal Feeding Profitable?", by S. A. Morgan, Supervisor, Waikato District Pig Council.

Napier—2YZ, on December 8, at 7 p.m., "Selecting Breeding Stock," by H. T. Donaldson, Supervisor, Tairawhiti District Pig Council.

Palmerston North—2ZA, on December 15, at 7 p.m., "The Case for the Pedigree Boar," by L. L. Marsdon, Supervisor, Wellington District Pig Council.

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SHOW DATES

THE following are dates and venues of A. and P. shows up to February 7.

December 2—Winton A. and P. at Winton.

December 2—Motueka A. and P. at Motueka.

December 2—Tokomairiro A. and P. at Milton.

December 2—Whangaroa A. and P. at Kaeo.

*December 5 and 6—Gore A. and P. at Gore.

December 9—Wyndham A. and P. at Wyndham.

December 12 and 13—Southland A. and P. at Invercargill.

January 1—Nuhaka A. and P. at Nuhaka.

January 12 and 13—Wairoa County A. and P. at Wairoa.

January 13—Blueskin A. and P. at Waitati.

*January 20—Central Hawkes Bay A. and P. at Waipukurau.

January 24—Marton District A. and P. at Marton.

*January 26 and 27—Horowhenua A. and P at Levin.

January 27—Helensville A. and P. at Helensville.

January 27—Waiau A. and P. at Tuatapere.

January 27—Golden Bay A. and P. at Takaka.

*January 30 and 31—Feilding A. and P. at Feilding.

February 3—Clevedon A. and P. at Clevedon.

February 3—Rodney Agricultural Society at Warkworth.

February 3—Rotorua A. and P. at Rotorua.

February 3—Banks Peninsula A. and P. at Little River.

February 3—Woodville A. and P. at Woodville.

February 3—Palmerston and Waihemo County A. and P. at Palmerston.

*February 6 and 7—Dannevirke District A. and P. at Dannevirke.

* The Department of Agriculture exhibit will be staged at this show.

Growing Linseed

By J. D. WRAIGHT, Fields Instructor, Department of Agriculture, Timaru.

THE growing of considerable acreages of linseed, mainly in the arable areas of the South Island, has been an important feature in the cropping programme of New Zealand for many years. The area of linseed grown has fluctuated considerably in the past. Over 10,000 acres were grown in the 1922-23 season, under 1000 acres in several years between 1936 and 1943, and the acreage is now in the vicinity of 20,000.

THIS variation was brought about by an unstable market which was governed mainly by the overseas price and demand for linseed and linseed oil, which had the effect of making the growing of linseed attractive to the farmer only in years when world prices for the product were high.

At one time a linseed oil extraction plant operated at Auckland, but because of lack of assured supplies of linseed for processing, the project was abandoned. However, during the Second World War seed from the linen flax industry began to accumulate and in 1943 a factory for expressing oil from this seed and treating by-products was established in Dunedin. As this factory has definite annual requirements of seed in excess of that available from the linen flax industry, the linseed crop is now contracted for on a fixed basis, with certain premiums payable to the grower for varying qualities of seed. This price is stable and the crop can now be regarded as financially as secure as any other of the spring-sown crops such as spring wheat, oats, barley, or linen flax.

As the seed contains on an average approximately 36 per cent. of oil, each ton of seed produces 75 to 80 gallons of oil. The types of oil produced in New Zealand from locally grown and imported linseed are raw, acid-refined, alkali-refined, boiled oil, double-boiled oil, pale boiled oil, stand oil, and blown oil.

The effect of the recommencement of linseed oil extraction and the consequent demand for supplies of raw material can be seen in the table below.

LINSEED ACREAGE GROWN IN VARIOUS DISTRICTS

		Canterbury	Otago	Southland	Other districts	N.Z. total
1947-48	..	16,087	1,266	1,178	197 (Marlborough)	18,728
1946-47	..	10,741	625	926	—	12,292
1945-46	..	8,927	926	505	3 (Wellington)	10,361
1944-45	..	3,640	336	348	2 (Marlborough)	4,326
1943-44	..	702	123	404	1 (Marlborough) 33 (Nelson)	1,263
1942-43	..	81	78	195	—	354
1941-42	..	387	185	269	18 (Wellington)	859
1940-41	..	1,194	90	—	—	1,284

Threshing linseed from the windrow.

Extent of the Crop

As better cropping conditions prevail in Canterbury and the linseed crop fits in very well with a fully arable programme, the greatest acreage of linseed is grown in that province.

Of the Otago acreage about 500 acres are grown annually in North Otago and 200 to 300 acres in South Otago. In Southland the main linseed areas are eastern and western Southland, each area growing about 500 acres annually. In the 1947-48 season 54 per cent. of the total linseed acreage in the Canterbury Land District (16,087 acres) was grown in North Canterbury, 34 per cent. in Mid-Canterbury, and 12 per cent. in South Canterbury.

Soil Types

As linseed is primarily a spring-sown crop, the growing of it fits in very well in those areas where it is not always possible to get land ready for wheat or other cereal crops in autumn and winter because of wet conditions or because lea land requires longer cultivation. For these reasons it is an excellent pilot crop on the browntop lands of the foothills. Where the crop is used for this purpose it leaves the soil in excellent mechanical condition for the growing of a cereal crop after the linseed. In North Canterbury about 500 acres per year are grown by contractors on a share basis on this type of land and to the farmer it is a means of getting his land cultivated with a minimum amount of work on his part, as the contractor attends to the cultivation and harvesting. In other areas in Canterbury the linseed crop is not confined to the foothills, but is grown mainly on clay downs, with some areas on the better-type stony soils. The heavy, rich soils are not suitable for linseed growing, as growth is usually excessive under these conditions, ripening tends to be uneven, and the crop presents many harvesting difficulties. On the poorer stony plains soils growth conditions are not good, yields are low, and the crop is uncertain.

In Otago and Southland the crop is grown under a variety of conditions: On land suitable for wheat in North Otago, on the clay loams of South Otago, and on the better-drained clay loams and gravel subsoils in Southland.

Cultivation

In most districts linseed is grown on land which is cultivated out of old run-out grass and this calls for some preliminary preparation such as grubbing or hustling the lea paddock or skim ploughing before the main

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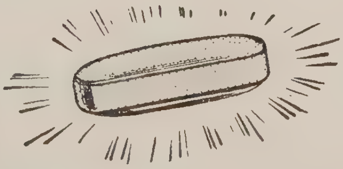

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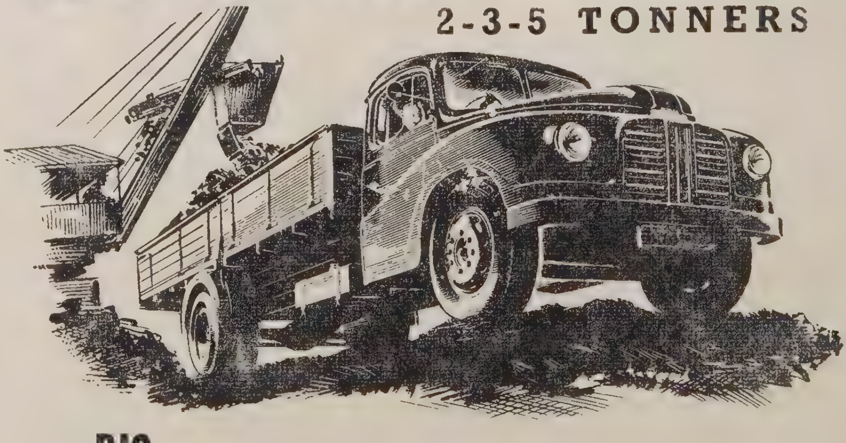

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ploughing. It is essential to avoid hollows under the furrows, and such preliminary work is the one way in which this can be achieved. Recently the digger plough has become popular for this work, as the skimmer places the edge of the furrow down at the base of the turned furrow and so achieves the same object in one operation. Also the quick-turn board of the digger plough fractures the furrow and so reduces the amount of subsequent cultivation required by discs or other implements.

The cultivation of linseed calls for only a medium depth of ploughing (4 or 5in.) and it is most important to get a good crumbly tilth, not a fine floury tilth, which sets badly with heavy rains and hinders the growth of the crop. To obtain a crumbly tilth early preparation is necessary, as late ploughing usually means hurried final preparation and consequent fineness of tilth.

In some southern districts, notably western Southland and South Otago, the crop is more likely to follow turnips, and preparation of such land for the linseed crop starts immediately after the turnips have been fed off.

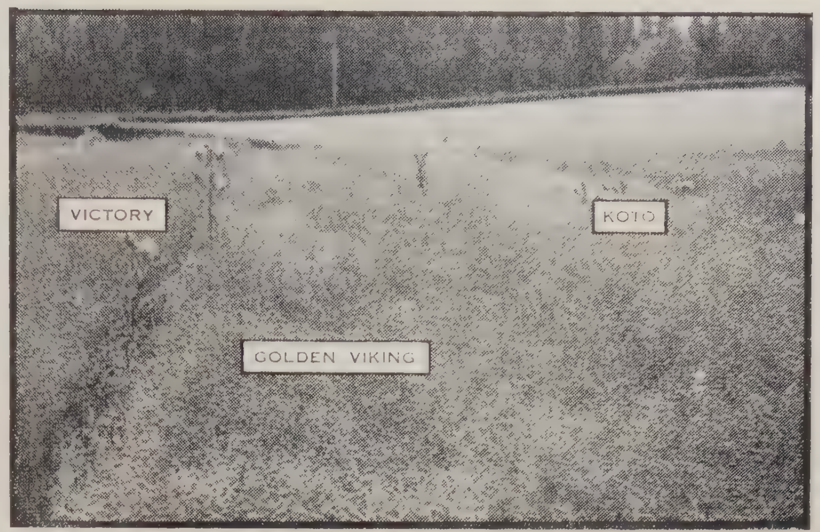
Fertilisers

Although many manurial trials have been laid down by the Extension Division to determine the manurial requirements of the linseed crop, no definite information has been secured on manurial recommendations. In districts where the sowing of superphosphate is general with cereal and other crops this fertiliser is sown with linseed, as it is considered that it helps in the initial establishment of the crop. Applications vary from 1cwt. per acre in the Canterbury district to 2 to 3cwt. per acre in Otago and Southland.

It is generally found that linseed does not respond to lime sown with the crop, but does better on soils which have been limed well during their period in pasture.

Like other crops, linseed gives better returns on land which has been improved through the growing of good pastures, and it is felt that the residual effect of phosphates and lime applied to those pastures and the general rise in fertility of the land are responsible for the increased yields now being obtained.

BEHAVIOUR OF VARIETIES OF LINSEED



Linseed varieties in a trial conducted by the Department of Agriculture.

Linseed crop in windrows.

Varieties

Of the seven harvested spring-sown trials in the 1948-49 season, good results were secured, which enable the following comments on the behaviour of the varieties of linseed to be made.

Golden Viking and **Victory** have been outstanding in yield preformance and desirable agronomic features. The former matures earlier and has somewhat shorter straw; both are rust resistant, have large bolls, and are attractive in appearance.

Koto was the most impressive variety, but has not yielded as well as Golden Viking or Victory except in the trials in Southland and Willowby (Mid-Canterbury). It matured early and was of moderate height, but it had small seed bolls and this may have been the cause of its relatively lower yield.

Walsh has yielded relatively poorly and appears to be of uneven type; it would seem that this variety could with advantage be replaced by Golden Viking and Victory.

Punjab has been low yielding and its extremely short straw and tough seed bolls make it difficult to harvest. It appears to be unsuitable for New Zealand conditions.

In one trial in South Canterbury **Cheyenne** yielded poorly, although it was most attractive in early growth.

Bison yielded well in one trial in Southland.

Other varieties such as **Rio**, which showed promise of rust resistance, **N.Z. Commercial Register**, **Royal**, and **Red Wing** have been dropped from the trial because of low yield or other disadvantages.

In practice Golden Viking has proved to be a very suitable variety for the Canterbury and North Otago districts and the bulk of the area contracted in these districts was sown with this variety. In Southland Bison is preferred, owing to its early maturity.

At present the choice of variety is to some extent limited by the availability of seed, but every endeavour is being made to have available supplies of seed of the varieties proving most suitable to local conditions.

Rates of Seeding

During the 1946-47 season trials were laid down to get information on rates of seeding. The trial was conducted in three widely separated districts, Swannanoa, Winchmore, and Kakanui, and included the varieties Bison, Walsh, Rio, and Golden Viking, sown at rates as low as 41lb. per acre to as high as 170lb. per acre. Yields from the low rates of seeding averaged 12cwt. per acre and from the high rates of seeding 12.1cwt. per acre, there being no significant difference in yields brought about by high or low seeding rates.

In practice 30lb. to 40lb. of seed per acre (varying according to germination capacity and seed size) are sown on the lighter land; on heavy soils 55lb. to 70lb. of seed are sown per acre.

Sowing

The crop is usually drilled through 7in. coulters and care must be taken that the seed-bed is firm to ensure even depth of sowing, as the seed is fairly small and a quick strike is desirable. To achieve this drilling should be carried out on a rolled surface and it is necessary for the soil to have been well consolidated throughout the earlier cultivations. If possible the coulters of the drill should be set in line and turnip coulters or well-worn coulter tips should be used to ensure that the seed is not placed too deeply. The depth of sowing should not be greater than 1in. It is not usual to harrow after sowing, as heavy grain harrows tend to put the seed in too deeply.

Sowing should be completed in October to avoid late harvesting.

Diseases and Weeds

Rust is the most serious disease of linseed. The rusts found in cereals and ryegrass, though related to those of linseed, are different strains of the fungus and cannot be transferred.

The existence of various rust strains complicates the problem of obtaining varieties of linseed resistant to rust. In testing for rust susceptibility it has been necessary to collect samples of rust from all parts of New Zealand, as it has been noticeable that though some varieties of linseed are practically free from rust in Southland, they may be severely affected in North Canterbury. This may be due to different strains being active in different districts.

The spread of rust in a crop is favoured by damp weather and in cases of severe infection yields may be reduced by as much as 75 per cent.

It has been found that autumn-sown crops are more severely attacked by rust than spring-sown crops, and when there are autumn-sown crops in a district they provide a means of overwintering the fungus and allowing early infection of spring-sown linseed.

Browning or stem-break causes damage in some seasons, but it is not considered a serious disease of linseed.

A disease called **pasmo** has appeared in some linseed crops, affecting large areas of the crop and hastening the maturity of the affected areas. In spite of fairly bad infestation, seed yields were not appreciably lowered by this disease.

Weeds: Most of the linseed is grown on clay downs country where the most serious weed affecting the crops in the young stages is spurry. This weed tends to choke the young seedlings and even when cultivation is properly carried out it may be serious, causing greatly reduced vigour in the crop and lowering yields.

Fat-hen may affect the crop at a later stage and can cause reduced yields. In most cases, however, it is not regarded as being as important as spurry.

Redshank is a troublesome weed in some areas, as the seed of this plant is very difficult to dress out of linseed.

Harvesting

The old method of cutting the crop with the binder, stooking, and threshing out of stook or stack is not used to any extent with the linseed crop, except in Southland and Otago, where bad weather may hold up other methods of harvesting. In the lower-rainfall areas of Waimea, North Otago, and Canterbury direct heading of the crop is largely practised, provided there is no excessive weed growth or second growth of the linseed itself.

For direct heading weather conditions must be good, as hot, dry days are necessary; any slight increase in humidity makes the crop very tough and difficult to thresh and harvesting under such conditions may cause the seed to be severely damaged.

Many growers prefer to cut the crop with the mower or to windrow it by a binder and some days later to pick it up and thresh it through a header.

The last method gives better results under difficult conditions than does direct heading.

Yields

Yields vary considerably with conditions, for it must be remembered that all the linseed crop is not grown under ideal soil and climatic conditions, and whereas yields of up to 1 ton per acre are secured from suitable land, yields of as low as 3cwt. per acre are obtained from poorly cultivated soils under unfavourable conditions. The average yield in Canterbury is about 8cwt. per acre, in North Otago 6 to 8cwt. per acre, and in Southland 10 to 12cwt. per acre.

Position Today

The linseed crop fills an important place in the cropping programme in the drier arable districts of the South Island, both as a cash crop to the farmer and also as a pilot crop preparatory to wheat or other cereals or for the establishment of pasture. Investigational work on varieties, rates of seeding, fertiliser applications, and weed control is proceeding in cooperation with farmers in an effort to solve some of the problems of growing the crop and attention is being given to diseases which affect it.

The growing of linseed is now established in the cropping districts and every effort is being made to supply the farmer with all the information which will enable him to make the growing of the crop a success financially and agriculturally.

* * *

DAIRY PRODUCE GRADED FOR EXPORT

THE following figures showing quantities of dairy produce graded for export during September and for the 2 months ended September 30, 1950, with comparative figures for the same month and 2-monthly period of 1949, have been compiled by the Dairy Division of the Department of Agriculture from figures supplied by divisional officers at the various grading ports:—

BUTTER—

Period	Creamery	Tons Whey	Total	Percentage inc. or dec.	Tons Total in store at end of mth.
September, 1950	13,939	285	14,224	—	16,815
September, 1949	16,183	273	16,456	—	17,135
Increase or decrease	—2,244	+12	—2,232	—13.563	—320
For 2 months ended 30/9/50	23,050	395	23,445	—	—
For 2 months ended 30/9/49	25,142	379	25,521	—	—
Increase or decrease	—2,092	+16	—2,076	—8.134	—

CHEESE—

Period	White	Tons Coloured	Total	Percentage inc. or dec.	Tons Total in store at end of mth.
September, 1950	6,568	933	7,501	—	9,620
September, 1949	5,533	1,892	7,425	—	8,495
Increase or decrease	+1,035	—959	+76	+1.023	+1,125
For 2 months ended 30/9/50	8,070	1,223	9,293	—	—
For 2 months ended 30/9/49	6,927	1,982	8,909	—	—
Increase or decrease	+1,143	—759	+384	+4.310	—

If these figures are converted into butterfat equivalent, there is a decrease of 6.515 per cent. in butterfat graded for the 2 months as compared with the corresponding period of the preceding season. It should be noted that the above figures refer only to butter and cheese graded for export, and that owing to diversions which may take place from time to time, they are not necessarily a true indication of production trends.

Hay and Seed Harvest

SEASONAL NOTES Contributed by the EXTENSION DIVISION

HAY is the main supplementary fodder provided on dairy farms and the aim should be to save hay of good feeding value. Fields should be cut as close as possible to the flowering stage of the chief grasses present, and the cut material should be turned frequently to dry it rapidly and protect it from over-bleaching by the sun. The pick-up baler has enabled the farmer to make the best use of short periods of favourable weather for haymaking and has reduced the risks attendant on early harvesting.

* * *

IRRIGATION OF LUCERNE

Lucerne for hay should be grown on all irrigation areas and irrigation should be carried out throughout the growing season. The usual practice is to irrigate twice before the first cut, again after each cut is cleared, and to give a further application of water during the growth period of each crop. Under these conditions four cuts in the season can be obtained from a good stand. The number of irrigations necessary depends on the rainfall during the growing season, but on well-bordered areas there is little danger of over-irrigation and the tendency is for irrigators to give insufficient water rather than too much.

* * *

IRRIGATION OF FODDER CROPS

Irrigators and research workers have not yet worked out completely reliable methods for applying water to root and green forage crops, but experience to date suggests that irrigation of the land before sowing gives considerable benefit and should be carried out at least a week before the crop is sown. Sometimes two applications of water are made before sowing; the first early in the season when the land is still in the furrow. The second application should be followed by cultivation at a depth of 3 or 4in. with the grubber before the land is finally worked down to sowing tilth. Irrigation of growing crops should be carried out while the crop is growing well; irrigation of wilted and moisture-starved crops often is not successful.

* * *

RYEGRASS HARVEST

Areas of perennial, Italian, and short-rotation ryegrass are usually closed in October; early in the month on light land or in dry seasons or toward the end of the month on medium to heavy land. Farmers should take full advantage of the pre-harvest seed-testing service made available by the Department of Agriculture; full particulars of the service are widely advertised in December each year. Samples for testing for blind seed infection should be taken within a week before cutting and while the seed heads are dry. The sample should be about as thick as one's wrist and made representative of the whole field by picking odd straws at random until the required sample is obtained. The sample should be labelled and rolled tightly in several layers of paper and forwarded by the first mail to ensure its arrival in fresh condition at the Seed-testing Station, Palmerston North or a blind seed testing sub-station. The report on the sample will indicate the amount of infection, for example, one-tenth, etc., and the stage of development, for example, flowering, very immature, middle stage, or mature or ripe.

Every irrigation farm should have an area of lucerne to provide hay for winter supplementary feeding.

WHITE CLOVER

The time of closing a pasture for a white clover seed crop depends on soil and rainfall. Generally, grazing can be continued during spring until the first flowers appear toward the end of October, but a field may have to be closed earlier if the season is dry or the land is light. However, on heavy land or in wet seasons closing in early December may not be too late to ensure a good crop. If it is not possible to even up the field by grazing, the growth should be topped with the mower.

* * *

MONTGOMERY RED CLOVER

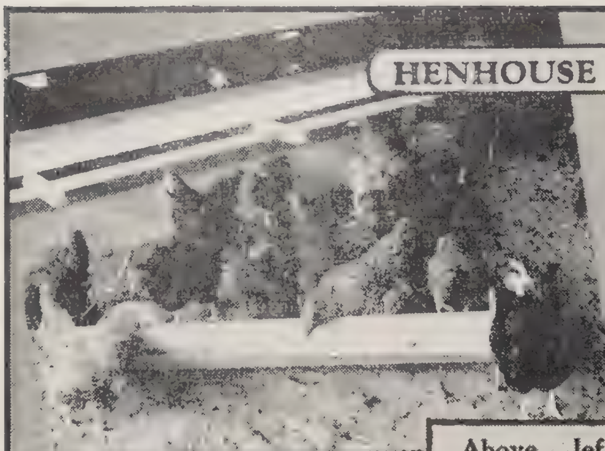
The yield and quality of Montgomery red clover seed depends to a very large extent on weather conditions during the period from closing to harvest. In seasons when growth is prolific and flowering uneven and prolonged, seed does not set freely and much is lost if harvesting is delayed. The grazing of Montgomery red clover areas in the first year allows the plants to become well established and produce high yields of seed in the following years. Stock should be removed from fields on light land as early as mid-October; fields on downlands are usually grazed until about the end of November and then topped. On heavy land the crop should be treated similarly to cowgrass, from which a hay crop should be taken early in December and the field then closed for seed.

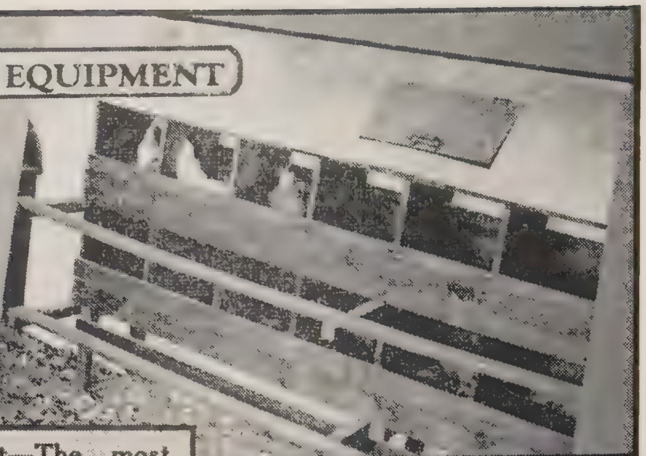
* * *

FARM STORAGE OF FERTILISERS

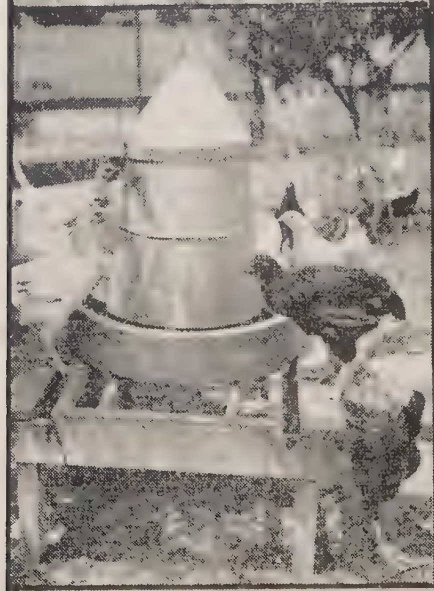
During recent years peak fertiliser demands in autumn have led to transport difficulties and delays in delivery. Farmers should order fertiliser early and store at least part of their annual requirements on the farm. The problem of farm storage is essentially one of keeping the materials dry, and the bags of fertiliser should be stored in such a way as to get the maximum of ventilation and the minimum of condensation. The bags should be stored on a wooden platform of crossed planks with as much space between the bags as possible. If bags are stacked in tiers, the tiers should be not more than eight bags high and a space of about 2ft. should be left between each tier. Serpentine superphosphate is ideal for farm storage, as it retains good physical condition under storage, being much superior to straight superphosphate in this respect.

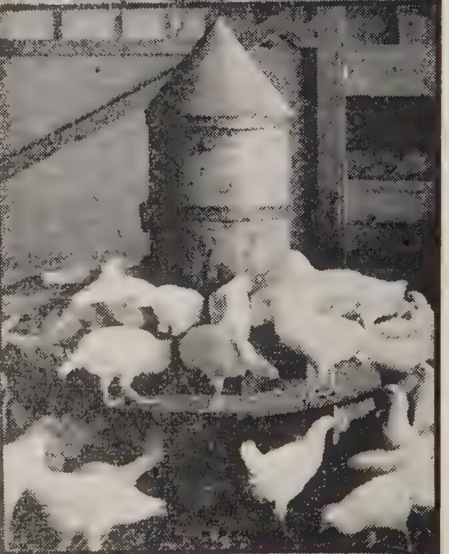
HENHOUSE EQUIPMENT

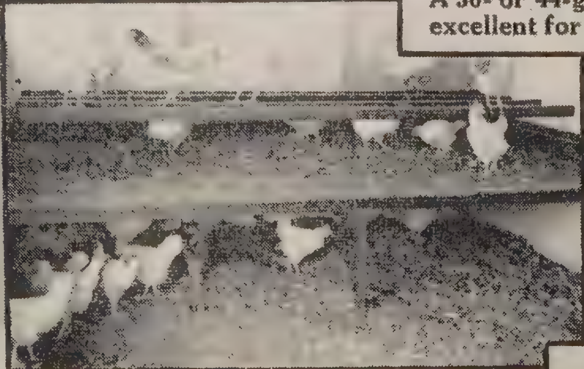


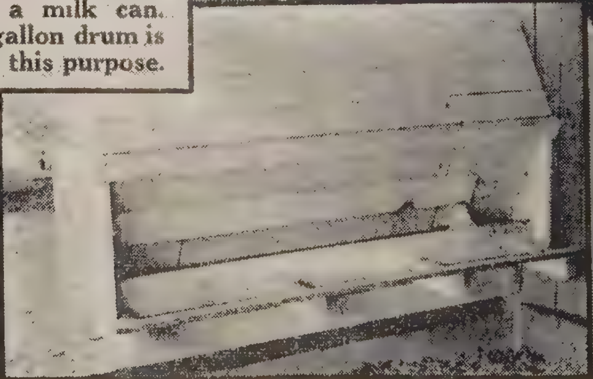


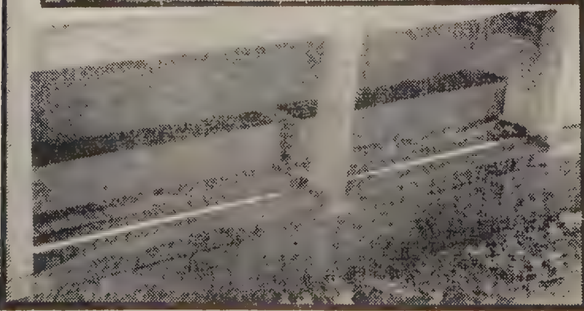
Above, left—The most common and easily made feed trough is V shaped, but it allows the birds to foul the food and to scratch it out on to the litter. Above, right—Ample clean, airy, comfortable nests are needed. The hinged alighting board can be raised at night, and the trapdoor in the sloping roof gives access to an egg-storage bin. Left—A well-made, automatic, dry - mash hopper. The lip on the saucer prevents wastage and the pointed cap prevents birds from perching on top. Right—A hopper made from a milk can. A 30- or 44-gallon drum is excellent for this purpose.











Above, left—If a droppings board is built too low, a dark hiding place is formed for timid fowls. The board should be 2ft. above litter level and the perches 10 to 12in. higher. Above, right—The wall type of mash hopper does not obtrude on floor space or provide cover for timid birds. Left—To help keep the floor litter dry, the drinking trough may be placed in a shelter built out on an outer wall of the house and provided with a slatted or netting floor so that the drips fall outside.

[Fraser Niederer photos.

Household Poultry Keepers Need Proper Henhouse Equipment

POOR as is the standard of the average backyard henhouse, it is better than the equipment in most household poultry runs. The great majority of backyarders make inadequate provision for working equipment and most of their henhouse fittings are makeshift, unsatisfactory, unsightly, and in need of repair. In this month's article for the household poultry keeper W. L. McIver, Poultry Instructor, Department of Agriculture, Hamilton, contends that, even if the fowls do not object to this state of affairs, the owners should consider their own comfort and convenience and should show some pride in maintaining the birds properly.

SUCCESS in poultry keeping is the result of a combination of good housing, proper management, and high-quality stock. Some people rate the stock as first in importance, but these three essentials have been placed deliberately in the order given. Excellent stock can be ruined by poor management, so to that extent management is more important than the strain of fowl, though even the best of management cannot make up for the deficiencies of inferior stock. Further, good management can undo only some of the harms caused by unsuitable or unsatisfactory housing; management which permits fowls to live in such housing is not good, so housing is of foremost importance.

Just as good management does not begin and end with feeding, so does housing imply more than accommodation. Included in the housing must be all the fittings and equipment necessary for the comfort of the birds and the convenience of the owner. Both aspects are important, because the most economic unit is that showing the best return for the least work.

As the general standard of household poultry accommodation and equipment is so deplorably low, here is some advice about features which frequently are neglected:—

Doors

Make the doors high, wide enough for a barrow to go through readily, and strong, especially the hinges. Do not build the outside door right down to floor level, but only to litter level, even though that does necessitate stepping over a barrier board when going in and out.

Perches

Plan the perches as one of the most important pieces of equipment in the house. Use high-quality, dressed timber, free from bark, cracks, and knotholes. An easy way to arrange perches is to rest them on two cross-bars suspended from the rafters by wires, like trapezes. To reduce swaying fix wire hooks to the bars and drive staples into which they can fit into the rear wall. Do not nail the perches to the cross-bars, but drive 4in. nails on each side of each perch so that the projecting heads stop them from moving. Directly under the perches and between the 4in. nails drive 1in. nails in pairs into the bars and leave the heads sticking out ¼in. to form an air space between the perches and the bars to counteract red mite. Creosote the perches and bars. If more than three rows of perches are needed to accommodate laying birds, the house is overcrowded. All perches should be on the same level.

Nests

Large and airy nests with provision for closing the entrances at night are best. Twelve fowls need only two nests 12in. wide, 14in. high, and 18in. from front to back, but more are necessary if the nests are smaller. Build them far enough above the floor to avoid the hens losing the floor space underneath, but not high enough to make it difficult for the birds to jump up to the opening; 18in. above litter level is high enough. Erect them in a dry, draught-free place which is not too well lit. Make them so that they can be dismantled easily for cleaning.

Drinkers

Drinking troughs need not be very deep or wide (5in. each way is sufficient), but should be long enough to allow several fowls to stand side by side and drink at the same time. The only satisfactory place for drinkers other than specially designed and expensive systems is outside the floor space of the house. Build out from one wall a niche rather like a nest box and place the troughs in it on a slatted floor to permit spilt water to fall outside the house.

Feed Troughs and Hoppers

There are many ways of making troughs and hoppers and several designs are satisfactory.

The chief point of design in a hopper is that it must not allow food to be wasted; if the fowls can scratch out any dry mash, they will not pick it up off the litter while they can get more from the hopper. Build the lip of the "saucer" 3in. higher than the base of the flow board which forms the front of the container. In turn this flow board base should be 3in. higher than the bottom of the hopper, making the height of the "saucer" 6in.

Whether a trough is V-shaped for wet mash or hopper-shaped for dry mash, adequate provision must be made for a number of fowls to feed at the same time. If wet mash is fed, all birds must be able to eat at once, but with dry-mash feeding the trough need be only big enough for a quarter of the birds at the same time. Troughs should be made so that they will not be fouled easily and can be cleaned readily.

Hoppers which can be divided into compartments are better than the drum or barrel type because provision can be made for the various items which should be available to the layers. The hopper should have small compartments for a mineral grit (such as oyster shell or lime), a hard grit (small, sharp, angular, road metal screenings), wheat, and meat meal; a large compartment should be reserved for dry mash.

Droppings Boards

To allow easy cleaning droppings boards must be carefully made, as the scraper will catch in any groove or projection. Flat asbestos sheeting has an excellent surface for cleaning. The boards should be cleaned daily.

Whether droppings boards are essential depends on circumstances. If the surrounding ground drainage is not good, they are necessary, but otherwise they can well be done without provided a proper and adequate floor litter is used.

Floor Litter

An inch or two of material on the floor is not adequate. A shallow litter can become moist too quickly and is difficult to dry out. Supplying 6 to 8in. of litter is also cheaper in the long run because it does not need changing as frequently as does a shallower layer. Put in 3 or 4in. of new litter at first and gradually add more until the depth is sufficient.

Materials which do not pack down hard are the best. A cheap and excellent litter is sawdust or wood shavings, or both. Dry garden soil can be added. If at least 6in. of litter is provided on well-drained flooring the litter need not be changed more frequently than once a year if the house is weather proof. Even then not all the old litter should be cleaned out; about a quarter or more should be left to enable the bacteria in the old litter to help break down the new litter.

Other Equipment

The essential items have been listed, but further equipment can ease the labour of keeping fowls. Have suitable bins or metal drums for food storage. Keep special buckets in which to carry food, a wide-mouthed box for droppings off the boards, a good type of droppings-board scraper, and a suitable basket for the eggs. Keep a catching hook in the shed so that birds can be caught for examination at any time.

Fowls cannot object actively to draughty, damp, dull, and sunless conditions; makeshift perches, nests, feeders, and drinkers; uncleaned droppings boards; fouled tops of nests, hoppers, ledges, and boxes; and rain beating in through walls and roofs; but their physical reactions will result in an objection in the form of a lower egg yield. Even if the owner is satisfied with fewer eggs, is not the comfort and convenience of the person managing the fowls of some importance? Many people refuse to keep a few fowls because of the alleged "tie", but if that disadvantage exists, it is usually caused by lack of equipment and failure to operate a suitable feeding system. Taking a pride in the hens and their housing and equipment is a factor likely to lead to success.

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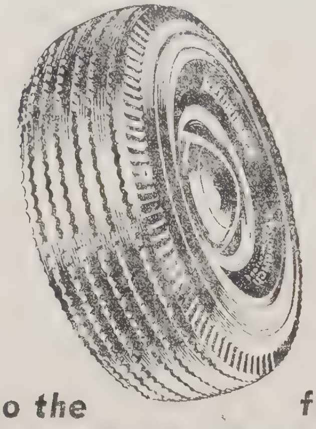

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The Home Garden in December

By S. O. GILLARD, Vegetable Instructor, Department of Agriculture, Auckland.

THERE is much important work to be done in December. With the main holiday period approaching, when many home gardens will be left unattended for a period, all necessary work should be completed before the holidays begin. This includes thinning, weeding, hoeing, spraying, and planting out of late-autumn and winter greens such as cabbage, cauliflower, broccoli, and leeks, and making successional sowings of dwarf and runner beans, beetroot, and in some districts swedes, peas, parsnips, carrots, and sweet corn.

[Green and Hahn Ltd. photo.

IN well-planned gardens there should still be adequate room for seasonal crops, but by the end of the month the garden should be filled with vegetables, some newly planted, others at different stages of maturity.

When the garden area is small and it is desired to produce more kinds of vegetables, interplanting may be done successfully provided quick-maturing vegetables such as lettuce, radish, and spinach are planted between rows of vegetables which take longer to mature. Cabbage, cauliflower, and root crops may be planted between rows of maturing potatoes, peas, and beans, and pumpkins, cucumbers, and melons may be interplanted with sweet corn. Interplanting, between maturing crops of peas or cabbage, of tender vegetable plants such as tomatoes, pepper, and egg plant, which are subject to wind damage, particularly when young, is an advantage, especially where the garden is exposed.

As soon as an early crop matures and is harvested no time should be lost in digging the plot over and preparing it for replanting, but a crop of a different family should always be chosen, as best results are obtained by growing crops in rotation.

To maintain a regular supply of salads such crops as lettuce, spring onions, and radish should be sown, and sowings of turnips, swedes, and peas can be made if a supply of moisture can be assured. In the North Island sweet corn and parsnips can still be sown and in the warmer parts where early frosts are not likely a late planting of tomatoes can be made. Earlier-planted tomatoes will require tying to their supports, and the shoots growing from the leaf axils should be removed before they grow more than 3in. long. In districts where blight is troublesome spraying the plants with Bordeaux mixture (4oz. of bluestone and 5¼oz. of hydrated lime to 4 gallons of water) or copper oxychloride plus an insecticide, such as D.D.T. 50 per cent. wettable powder at the rate of ½oz. in 4 gallons, for the control of the tomato caterpillar should not be neglected.

If celery plants are available, trenches or beds may be prepared now and plants set out. Plants should be kept sprayed with Bordeaux mixture (at the same strength as for tomatoes) or with copper oxychloride to protect them from leaf spot, caused by the fungus *Septoria apii*, which is one of the most serious diseases affecting celery.

As lettuce does not establish readily when transplanted during hot weather, it is best sown in a permanent bed and thinned. From December until April it is an advantage to sow or plant all vegetables on the flat. This is important during the drier and warmer months, as it facilitates watering and liquid manuring. Cauliflower, cabbage, brussels sprouts, and leeks should be moulded up as they grow.

Root crops such as carrots and parsnips and other kinds requiring space to develop should be thinned as soon as plants are large enough to handle.

Weeding and hoeing should not be neglected even among well-established crops. Weeds not only rob plants of food and moisture, but they are often the host plants of disease and insect pests. Hoeing will assist aeration and will help conserve moisture.

Supports should be provided for runner beans and tall-growing peas, and dwarf peas will also benefit if kept off the ground.

Kumara plants will now be sending out runners, and if these are not lifted occasionally, they will become attached to the soil and plants will make excessive vine growth at the expense of tubers. The soil should be kept moulded up to maintain the ridges in which the tubers form and all weeds should be removed carefully.

Harvesting of rhubarb should now be discontinued and the plants allowed to develop leaf growth to enable the crown to build up reserve supplies of food for the production of next season's crop. Where heavy pulling of the stalks has been practised leaf growth will be stimulated if a handful of blood and bone is applied around each plant and worked in lightly.

Liquid manure can be applied to most crops to advantage, and where necessary watering or irrigation should be attended to. Adequate soil moisture is very important for growth and setting of beans, to the growth of radish, celery, and lettuce, and to slightly less extent to other growing vegetable crops. Potato and onion crops nearing maturity should not be watered, as watering is liable to start them into second growth and to impair their keeping quality.

Onion plants set out in August will now have reached the stage when the bulbs are forming. When cultivating to suppress weed growth do not draw the soil up over bulbs, which develop best on top of the ground. If onion plants were set a little deep, it is an advantage to press the soil away from the onion, exposing the bulb. In doing this care must be taken not to damage the roots.

Broad Beans

Broad beans sown in May will have finished bearing, but where later sowings were made the harvest will extend to December, when they are of value in the home garden, as relatively few varieties of vegetables are

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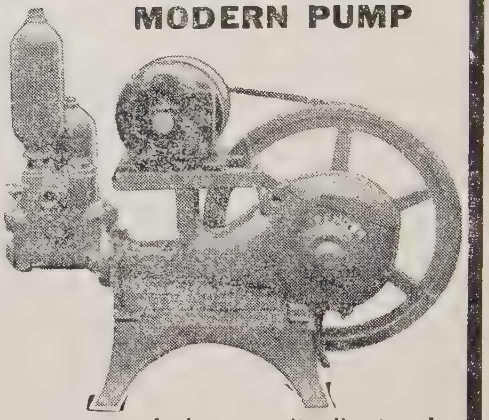

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ready for use at that time. To promote good setting of the pods pinch the top out of each stem as the plants begin to flower. If boiled like spinach, the tops of broad beans may be used as a vegetable. The broad bean plant will continue to produce pods for a longer period if the beans are picked as soon as they become ready to use. If the plants are allowed to mature the seeds, they cease flowering and die off.

Dwarf and Climbing Beans

Provided adequate moisture is available a supply of french beans can be maintained in northern districts from December until the plants are cut down by early-winter frosts. To secure continued harvesting the dwarf varieties should be planted every 3 weeks up to the end of January; two sowings of runner beans (one in September or October and one in January) usually give a continuous supply. In the colder parts of New Zealand the season for beans is much shorter, but should be spread over as long a period as possible by using the warmest positions for early and late sowings. Sown under favourable conditions dwarf beans produce their first beans in 7 to 9 weeks; annual climbing beans require 10 to 12 weeks. For late sowing a warm and sheltered position is desirable.

Beans grow well in most soil types, but prefer a good friable loam well supplied with organic matter. If the soil is reasonably fertile, the only manure required is a mixture of equal parts of superphosphate and bonedust sown along both sides of rows at the rate of 1oz. to 2ft. of row when the plants are well up. If artificial fertiliser is allowed to come into contact with the bean seed, it may cause poor germination.

Dwarf varieties should be sown in drills drawn out with a hoe 18in. to 2ft. apart and 3in. deep. The seed is best sown in a double row along the wide drill, the seeds being staggered; seeds should be spaced 3in. apart. Cover the seed with soil and rake the surface level.

[*Sparrow Industrial Pictures Ltd. photo.*

Where garden space is limited crops such as sweet corn can be grown with pumpkins.

Supports will be necessary for climbing beans. These may be provided by a wire-netting fence, preferably 6 to 8ft. high, the seeds being set 6 to 8in. apart in a single row each side and 5in. out from the netting. Alternatively, beans can be supported by wooden stakes 6 to 8ft. long placed in a double row and spaced 1ft. apart each way. The stakes are drawn together at the top and attached to a cross-stake; two seeds are set, one each side of the stake. Another method is to place 4 stakes 6 to 8ft. long 2ft. apart each way to form a square. The tops are drawn together wigwam fashion and tied, the operation being repeated to form a row of wigwams; three seeds are set to each stake, one each side and one in front of the stake.

When vines of climbers are 2ft. 6in. high the terminal shoots of runners should be pinched off. This causes the flower buds to form much lower on the vines than if they were allowed to grow at will. This operation can be repeated when the vines have grown up another 2ft.

During dry spells watering may be necessary. If the roots are allowed to become dry, the flowers may fail to set satisfactorily. Frequent hoeing will suppress weed growth and help conserve moisture during dry weather.

Varieties

Recommended varieties for planting during December and January are:—

Dwarf: The Prince, Sydney Wonder, Surprise, and Tendergreen.

Climbing: Fardenlosa and Market Wonder.

Carrots

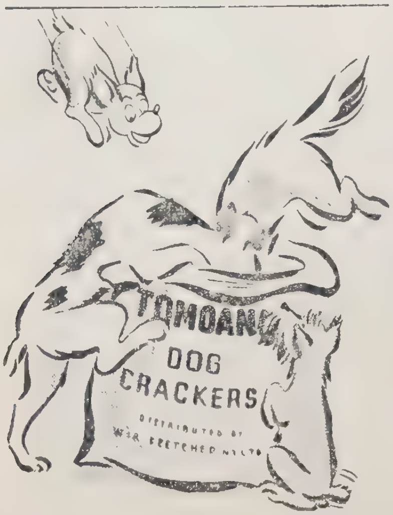
Carrots are an excellent winter vegetable, and the main winter crop may be sown this month. Successive sowings can be continued, and in districts where the carrot rust fly is troublesome carrots sown in December or later usually succeed without special precautions.

Soil moisture should be maintained, as dry conditions check growth. Good-quality roots of intermediate or stump-rooted carrots are usually secured in late autumn from December and January sowings, whereas by autumn earlier sowings have developed to a large size and become coarse.

Carrots do well without additional applications of fertiliser in soils which have been heavily manured for previous crops. The only fertiliser necessary for most other soils is a mixture of equal parts of superphosphate and bonedust applied at the rate of 2oz. a square yard. A dressing of wood ashes at the same rate will also be beneficial

[*Sparrow Industrial Pictures Ltd. photo.*

Kumara plants should be lightly hoed frequently and the ridges in which the tubers form should be maintained.



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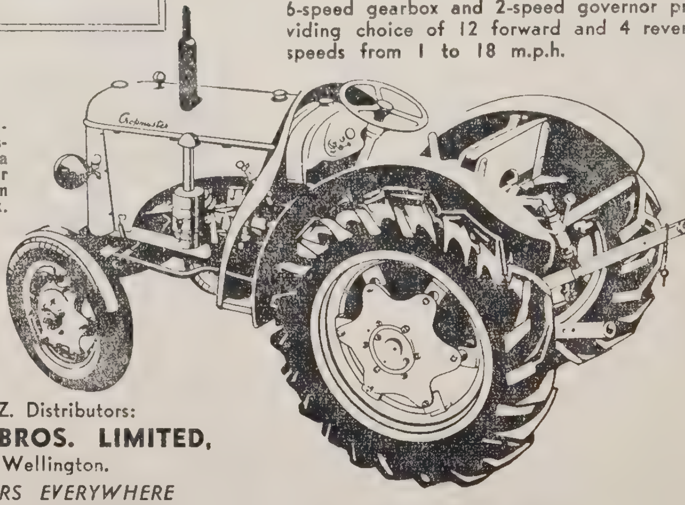

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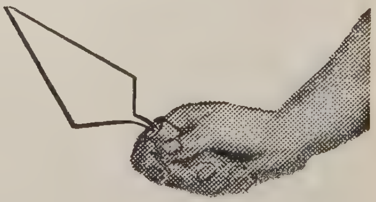

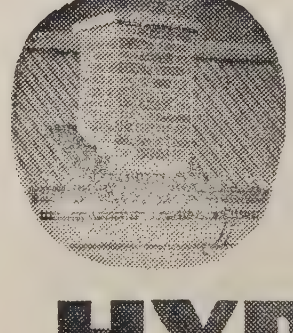

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and can be applied with the fertiliser. Seed should be sown thinly ½in. deep in rows 12in. apart and the plants thinned when about 3in. high to 3in. apart. A quarter of an ounce of seed will sow 100ft. of row.

Types

Types may be classified as follows:—

Long-rooted: Mature roots may be 10in. or more long and taper to a distinctly long drawn-out point. They penetrate deeply and therefore the plants may get more water when established than shorter-rooted kinds. This may be important in dry seasons in certain areas. Long-rooted varieties do best on a comparatively light, deep soil of medium quality. Recommended varieties are Intermediate and Altringham.

Medium-length: These are usually less than 8in. long. The varieties of this group include Chantenay, Earlykrop, and Manchester Table.

Short, stump-rooted types are useful for heavy or for shallow soils. Examples are Oxheart (Guerande) and Early Scarlet Horn.

Recommended varieties for December and January sowings are Chantenay and Earlykrop.

[Sparrow. Industrial Pictures Ltd. photo

Good-quality rhubarb may be obtained by applying an abundance of plant food and by not weakening the plant unduly by stripping it of foliage at any time.

Asparagus

To encourage development of the fern growth necessary for building food reserves in asparagus crowns for next season's crop the cutting of spears should cease about 8 weeks from the first harvesting (usually about the end of November for northern districts and toward the end of December for southern districts). The beds should be weeded and lightly forked over and should receive a dressing of blood and bone at the rate of ½lb. per square yard plus ½oz. of sulphate of potash a square yard; if wood ashes are available, a dressing at the rate of 1lb. a square yard can be substituted for the potash.

Well-rotted stable manure or compost spread over the surface of the bed will also assist the growth of strong healthy fern. Heavy fern growth also assists in the suppression of weeds and once it becomes established the beds should require little attention during summer.

Celery

Celery can be planted out in the garden from December to March. Most home gardeners will prefer to purchase plants from seedsmen rather than raise them from seed, as few gardeners except those in the warmer and more sheltered districts can sow and raise plants successfully without a cold frame or small glasshouse.

[Sparrow Industrial Pictures Ltd. photo.

Carrots are particularly desirable, especially for children, as they are a good source of vitamin A and a fair source of vitamins of the B group and vitamin C. Good-quality roots for winter use can usually be obtained from a sowing made in December.

Raising Plants from Seed

Where plants are to be raised seed should be sown fairly thickly—about a level teaspoon to a standard tray (22in. x 12in. x 3in.)—and covered very thinly by a sprinkling of soil, which is then firmed with a flat piece of board. The seedlings should appear in 1 or 2 weeks and during this period the seed-box should be kept moist by careful watering. Seed should be sown about 10 weeks before the plants are required for setting out in the garden. When the seedlings are large enough to handle, usually about 3 weeks after emergence, they should be pricked out 2in. apart each way into seedling boxes.

Planting Out

Four to 6 weeks from pricking out, plants will have made sufficient root growth to enable them to hold the attached soil when cut out of the boxes in squares. They may then be planted out in the garden, and if care is taken in planting, little check to growth should occur. If celery is planted out in the garden too early in the season, the plants are liable to receive a check in growth through adverse weather conditions, which may cause them to bolt to seed. For February-March planting seed may be sown in December in an open nursery bed. The seedlings should be watered thoroughly before they are set out in prepared beds or trenches. Trenches are preferable where conditions are dry, as beds are usually more difficult to water. The plants are set in double rows in trenches. For early or late planting they can be set out on level or slightly raised beds in which are planted 4 or 6 rows 12in. apart with 8in. between the plants in the rows. Trenches should be shallow except where it is intended to earth up the plants for blanching later. The soil in the trenches should be enriched with well-rotted farmyard

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A bed of self-blanching celery with board moved slightly to show the blanching stems. Celery grows well in beds on the flat if soil moisture can be maintained.

manure or compost or a fertiliser mixture. For beds the ground should be deeply dug and well worked.

Crisp, well-blanched celery is deservedly popular and to produce it in this condition requires rapid growth without checks. A few days before planting, a fertiliser mixture consisting of equal parts of blood and bone and superphosphate plus 5 per cent. of sulphate of potash should be broadcast over the beds at the rate of 1lb. a square yard and worked into the top 3in. of soil. For trenches the same mixture should be well worked into the soil at the rate of 2oz. per foot of trench.

Celery requires an adequate supply of moisture during growth, and as celery is shallow rooting (many of the roots are within 2 or 3in. of the surface), cultivation should be shallow.

Blanching

When the plants have attained a usable size blanching should be started. This is done by excluding the sun from the stalks of the plants thus preventing the formation of chlorophyll (the green colouring matter) in the plant cells. The easiest method of blanching is to surround each bed with 10 or 12in. boards. The method of placing the boards is to lay them flat on either edge of the path along plant rows, force the inside edge against the plants, and then raise them to vertical, bringing up all the outside leaves. The boards are kept in position by short stakes driven in on the outside. Another method is to cut sections of wrapping paper and wrap each plant separately, leaving only the tops of the plants exposed. Blanching by moulding the soil up around the plants is not the best method, although it is commonly practised by home gardeners. In warm weather it may cause the plants to decay, and development of leaf spot and injury to the stalks is encouraged.

The following are three types of celery:—

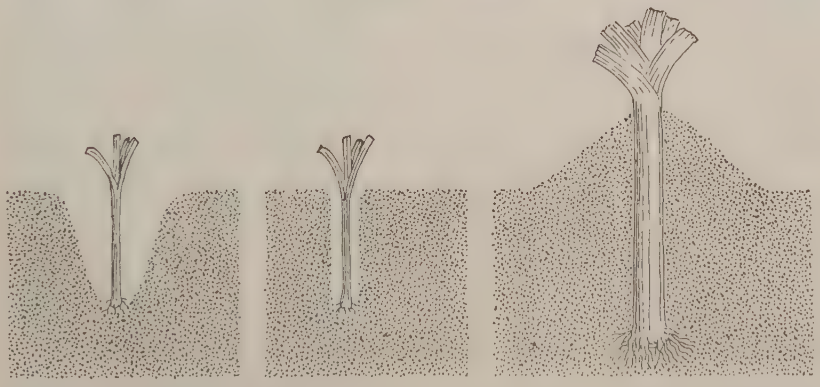
Golden self-blanching: Varieties include White Plume, which has a dwarf habit and is a good early variety, and Gilt-edge Golden, a stocky, very heavy, perfectly solid variety with a splendid flavour; it is the type most popular with commercial growers.

Late: Solid White is an excellent late variety; it is very hardy and is the best of the English large, white-stemmed sorts.

Pink or red: Examples are Superb Pink and London Prize. Their flavour is nut-like, quite distinct, and pleasant; the pink, red, or purplish colour is distributed over the outer stalks, but occurs mostly at the margins of the inner stalks, which are otherwise white or cream.

The best varieties to plant in the home garden during December and January are White Plume and Gilt-edge Golden. For winter growing Solid White is best.

PLANTING LEEKS



Left—Correct method of setting out young leek plants in a trench. Middle—Leek planted in a dibble hole and watered; watering usually settles sufficient earth around the roots. Right—Drawing up earth around the plant as it grows will blanch the stem. Before planting leeks trim back the leaves level with the heart leaf and shorten the roots to within 1½in. of the bulb.

Celeriac

Celeriac is commonly called turnip-rooted celery. The stem develops into a bulb 2 to 4in. in diameter and is the portion of the plant that is eaten. The bulbs are trimmed, washed, and, without salt or other flavouring, boiled until tender. They may be pared, sliced, and served with white sauce or left uncut to be sliced up for salad when cold. Celeriac is often used in soups and stews. The seed may be sown outdoors from September to January; subsequent treatment of the seedlings is similar to that for celery.

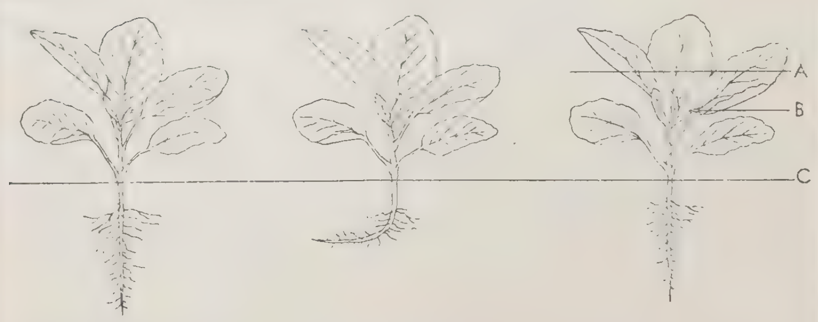
For best results celeriac requires a deep, moist soil with a good humus content. The seedlings should be planted on flat beds in rows 18in. apart with 12in. between the plants. Celeriac does not require blanching.

Leeks

The leek is used in a similar way to onions and its cultural requirements are also similar to the latter. It forms a thick, fleshy stem without a bulb. Seed sown in beds in September should be ready for planting out in December or January.

If leeks are not grown in rich soil and kept watered during dry weather, they are liable to become tough. Good results may be obtained on fairly heavy ground providing it has been well prepared. A fertiliser mixture composed of equal parts of blood and bone plus 5 per cent. of sulphate or muriate of potash should be worked into the soil before planting at the rate of 4oz. per square yard.

When the young seedlings are about the thickness of a lead pencil they can be set out 6 to 8in. apart in rows 18in. apart. The usual practice is to make holes with a round dibble to a depth of 5 or 6in. and drop plants into the holes. Watering usually settles



Transplanting brassicas. Left—The correct way to plant. Middle—the incorrect method. The taproot is bent and this retards the flow of sap to the plant and results in slow growth and shallow root development, which are a disadvantage in dry soils. Right—The amount of transpiration can be reduced and plants kept from drooping unduly by cutting off the outer leaves. A—The level to which leaves should be cut. B—Young leaves in the centre, which should not be touched. C—Depth to which plants should be set.

sufficient earth around the roots. When transplanting, the leaves should be trimmed and the roots shortened to within 1½in. of the bulb.

Gradually fill in the holes when cultivating and as the plants grow mould the soil up around them to cause the stems to lengthen. To secure a well-blanched stem the plant needs to be covered fairly deeply by soil. Cultivate frequently between the rows and around the plants to conserve soil moisture and check weeds. Be careful when hoeing or drawing up the soil not to cover the heart of the plant. Leeks require plenty of moisture and must be kept well watered in dry weather while the crop is growing.

Leeks may also be set in trenches 6in. deep similarly to celery. The trenches may be narrower than those used for celery, but the plants require more room and should be spaced 12in. apart for this method.

Leeks can be used any time after they have grown to a usable size, but if left long enough under favourable conditions they will grow to at least 1½in. in diameter with usable stalks 8 to 12in. long. Leeks keep well right through the winter and will not deteriorate in quality until they begin to develop seed stalks in spring.

Recommended varieties are:—

London Flag: This is a good early sort and very hardy.

Musselburgh is the best variety for general cropping, is hardy, and forms a longer and thicker stem than London Flag (from which it is a selection) with large but somewhat narrower leaves.

Lyon: This variety is suitable for a late crop, as it is slow to run to seed in spring and grows very large.

Parsnips

Parsnips require a long growing season, and although a December sowing can be expected to succeed in the warmer northern districts, the only type likely to grow to a usable size in southern districts when sown in December is the turnip-rooted varieties.

For best results the land should have been heavily manured for a previous crop; the seed should be sown fairly thickly ½in. deep in drills 18in. apart in well-prepared soil and the plants thinned later to 4in. apart.

The best variety of parsnip is Hollow Crown, but the turnip-rooted parsnip matures quickly and is suitable for shallow soils. It is of first-class flavour and well worth a trial.

Swedes

Swedes can be sown now in most districts. Usually they are preferred as a winter vegetable, and as they keep well under cool conditions, they are a valuable addition to the supply of vegetables during winter. The ground should be well prepared, and land that has been heavily manured for a preceding crop is well adapted for the growing of swedes. If it is necessary to add manure, a mixture of equal parts of blood and bone and superphosphate plus 5 per cent. of sulphate of potash broadcast over the area at the rate of ¼lb. a square yard and raked in when preparing the ground is satisfactory. Seed should be sown thinly ½in. deep in rows 15in. apart and the plants thinned when they are about 2in. high to 6 to 8in. apart in the rows.

Recommended varieties are Laing's Garden and Superlative.

Tomatoes

In the North Island and in the warmer parts of the South Island tomatoes may still be planted for the late crop. Plants set out now will continue the supply of this valuable vegetable until they are cut down by early-winter frosts. Late plantings should be supported, because if plants and fruit are allowed to lie on the soil, they are more susceptible to blight. As plants grown at this season of the year often fail because of an attack of blight, they should be sprayed at intervals of 10 days with Bordeaux mixture (4oz. of bluestone and 5¼oz. of hydrated lime in 4 gallons of water) or with copper oxychloride to which has been added ½oz. of commercial D.D.T. 50 per cent. wettable powder.

When soil conditions are dry water should be applied. The plants should not be watered overhead if it can be avoided, as this not only washes off the protective spray, but may cause damage to the plant through sun scald.

Recommended late varieties are Potentate, Supreme, and Market Favourite.

Winter Greens

The provision of a supply of winter greens is a problem for many home gardeners. During the favourable growing periods of the year there is little difficulty in providing a succession of green vegetables, but it is much more difficult to maintain a supply in winter. Although root crops are a good standby, most gardeners desire a regular supply of green vegetables rich in the vitamins especially required during winter.

In southern districts December, January, and February are the preferred months for planting winter green crops. In the North Island, because of milder conditions, the planting period can be extended to April or even later for some varieties.

The principal winter green crops are cabbage, broccoli, cauliflower, brussels sprouts, and kale; plants may be obtained from seedsmen. They should be planted in a rich, deeply cultivated, well-drained soil. The incorporation of organic material such as well-rotted stable or farmyard manure or compost or the digging in of a heavy green crop is desirable on most home garden soils. In addition a fertiliser mixture consisting of 10lb. of blood and bone, 3lb. of superphosphate, and ¾lb. of sulphate of potash should be applied along the plant rows at the rate of 8oz. to 6ft. of row. It should be well mixed with the soil before planting to avoid possible damage to the plant roots.

Moisture is essential during dry weather and the soil must not be permitted to dry out. Where insect pests such as white butterfly are troublesome plants should be protected by dusting them with D.D.T. dusting powder or spraying them with D.D.T. wettable powder. With a 50 per cent. wettable powder use ½oz. in 4 gallons of water and with a 25 per cent. powder 1oz. in 4 gallons. A wetter, spreader, or sticker should be used to increase the efficiency of the spray, because it will make the droplets adhere better than where such an agent is not employed. Particularly is this so on the waxy-surfaced leaves of plants of the cabbage family, although it applies to some extent to most plants. Applications should be made every 3 or 4 weeks, but should be discontinued 4 weeks before using the vegetables.

There is a wide range of varieties suitable for planting out this month and a selection may be made from the following (approximate maturity dates are shown in parentheses):—

Broccoli: Broccoli No. 1 and St. Valentine (August and September), Broccoli No. 2 (October), and Broccoli No. 3 (October and November).

Cauliflower: Early London and Phenomenal Early (March and April), Phenomenal 5 Months and Veitch's Autumn Giant (May and June), and Phenomenal Main Crop and Walcheren (July and August).

Savoy cabbage: Omskirk Early (April and May), Drumhead (May and June), and Omega (July and August).

Kale: Dwarf Green (March) and Tall Green (April).

Brussels sprouts: Scrymger's Giant and Fillbasket (April and May).

New Type of Fence Designed by Hawkes Bay Farmer

AT a time when fencing materials are very costly and good fencing timber has almost disappeared in most parts of New Zealand, the type of fence being erected by Mr. C. Hunter on Huiarau Station, Waione, southern Hawkes Bay, should be of special interest to farmers. This fence, which has already attracted a great deal of interest in the Wellington Province, is described in this article by F. J. S. Holden, Fields Instructor, Department of Agriculture, Dannevirke.

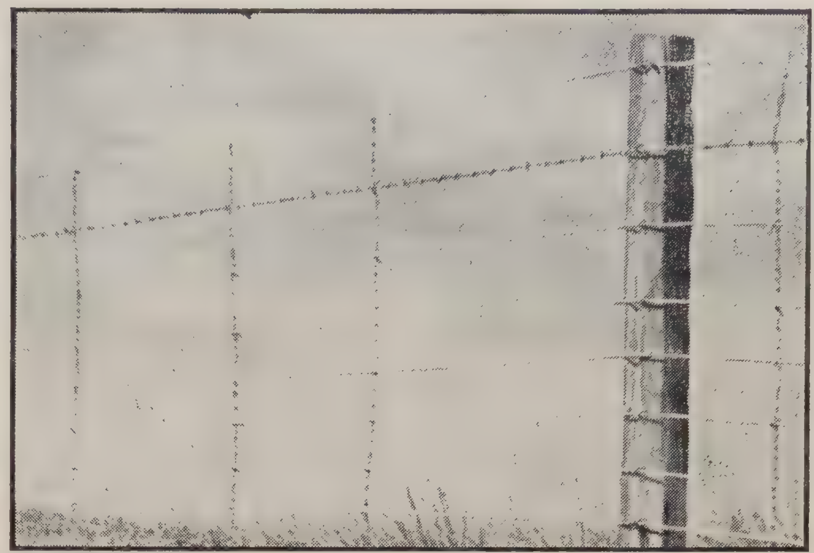


Fig. 1—Hunter fence showing battens replaced by chain. Plain wire is shown on the bottom, but this has since been replaced by barbed wire.

A RECENT survey of Akitio County, in which Mr. Hunter's property lies, reveals this very serious position regarding fencing posts: Of some 750,000 fencing posts in the county, about 500,000 have been in the ground for at least 30 years and half of these have stood for over 40 years. It is estimated that in the next 10 to 12 years the county will require 500,000 fencing posts compared with 58,000 actually used in the last 10 years. This will give an indication also of the number of battens required. There is no doubt that many other hilly counties, particularly in the North Island, are in a similar plight, and it is obvious that the supplies of durable timbers will be inadequate. Concrete posts can be used, but these are even more expensive than good wooden posts, and many battens will have to be cut from inferior timbers. In many districts suitable materials for fencing are difficult to obtain.

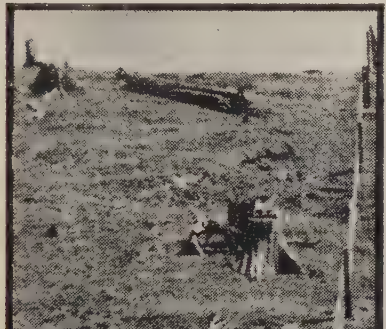


Fig. 2—Hunter fence, showing in foreground span of 30yds. without posts.

Realising the need for a cheaper and more durable type of fencing, particularly on hill country, Mr. Hunter set out to find a means of erection using the minimum of material while maintaining the efficiency of the fence in holding all classes of stock. The result of his efforts is a trial length of fencing on his farm which has several novel features and which is proving quite satisfactory. Many farmers have inspected the fence and have shown their approval of it by adopting the method of construction.

The New System

The Hunter fence differs from the orthodox method of construction in the following respects:—

The normal average of 5 posts per chain is reduced to 2 or 3 according to the nature of the ground.

In low places or on a convex line posts are replaced by 9- or 10-gauge galvanised chain anchored by a non-corrosive wire, such as stainless steel, to a wooden or concrete block sunk a suitable distance into the ground.

Wooden battens are replaced by lengths of light galvanised 12-gauge chain clipped on with a special wire clip. Batten chains are prevented from running along the fence by clipping them to the barbed wires at the bottom and second from the top. If barbed wire is not desired, chain is bound tightly to the top and bottom wires.

The inventor is justified in claiming the following advantages for this type of fence:—

Reduction in cost of materials: The light 12-gauge chain battens cost approximately £2 16s. 6d. per 100, compared with £4 per 100 for wooden battens, often of inferior quality. There is a further saving of 2 or 3 posts per chain, and where posts are replaced by 9-gauge dip chains and stainless steel anchors the cost is about 2s. compared with 7s. 6d. for a concrete post. On an average the total saving should be more than £100 per mile. This is a conservative figure.

Greatly reduced cost for haulage of materials by road and on the farm: Less than half the number of posts is required and light chain replaces battens. Thirty chain battens weigh 9lb.; the same number of wooden battens would weigh over 1cwt., as well as being bulky and awkward to handle.

Greater durability: The galvanised chain battens can be expected to last as long as the fencing wire and certainly much longer than any wooden battens or timber posts. The method of fixing the wires to the chain battens reduces the damage and wear on the wires which results from stapling wires to battens.

Lower maintenance costs: Maintenance costs are likely to be reduced, because the new fence can be strained more easily and quickly. With no stapled battens and the wires running freely through the wire clips used to

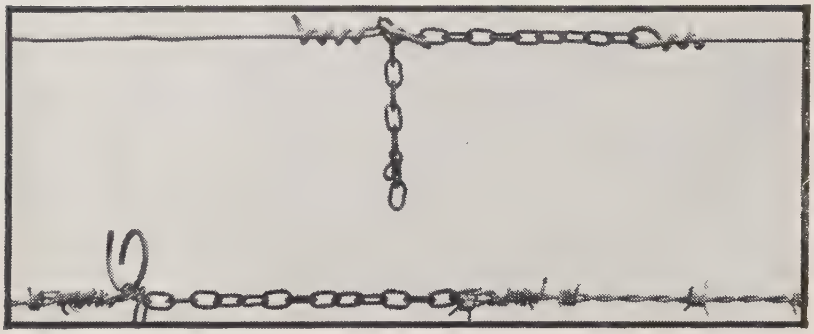


Fig. 3—Chains inserted for use in straining the fence.

fasten the chains, straining is a simple operation. It is claimed that one man could strain a mile day. Since the chains have a long life and are securely fixed to the wires, much less work will be required to keep them in order than is the case with wooden battens, particularly where inferior timber has to be used for battens. The elasticity of the fence and wider spacing of posts tend to absorb shocks and the wire is not so subject to bending and fracture. The fence is easier to repair on country liable to slips, as there are fewer posts and no battens to be dug out and the wire can be pulled through the chains. Wires are not as likely to rust as when some types of wooden battens are used, and the chains offer much less resistance to strong winds, reducing the wear on the wires and posts and allowing for a much wider spacing of posts.

Resistance to Stock

The ability of this type of fence to hold all kinds of stock has been well tested on Mr. Hunter's farm. An animal cannot get through the fence or under it if it is properly erected, and should it charge the structure between the posts, the effect is similar to hitting a wire mattress. The fence first gives, then springs back into position, and there is less likelihood of breaking a post, because the shock is absorbed. Cattle which jump the fence do less damage, as there are fewer posts to break.

An important point made by Mr. Hunter is that the fence should be kept strained fairly tight to prevent sagging and loss of height between posts. To simplify straining he suggests the use of a 2ft. or 2ft. 6in. length of chain let into each fence wire at the middle of the strain. One cut end of the wire is fastened to one end of the chain, a loop is made in the other end of the wire, and the chain passed through it. The chain is used for straining and a piece of No. 8 wire is passed through the chain when it is tight. The wire is bent in a circle, as a straight piece may cut stock (see Fig. 3).

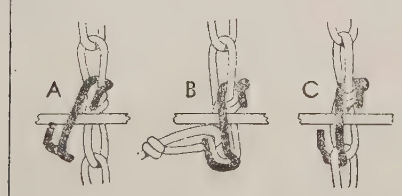


Fig. 4—A—The clip is hooked into the chain as shown and passed over the fence wire. B—The next link of the chain is raised so that the lower end of the clip can be hooked in. C—Shows how the fence wire is clipped securely to the chain.

Reduced Cost

The following are average costs which farmers can check and apply to their own districts.

An orthodox 8-wire post-and-batten fence with 5 posts per chain and wooden battens 3ft. apart would cost approximately £490 per mile on the line at Mr. Hunter's farm, 35 miles from rail, calculated as follows:—

	£	s.	d.
400 totara posts at 9s. ..	180	0	0
1360 totara battens at £5 per 100 (conservative) ..	68	0	0
6 wires No. 8 plain and 2 barbed	94	0	0
8 anchors or stays at £1 ..	8	0	0
4 gates at £5	20	0	0
Erecting at 30s. per chain ..	120	0	0
	£490	0	0

The cost of the Hunter fence, based on the cost of the length erected, would be:—

	£	s.	d.
Totara posts at 2 per chain	72	0	0
Chains, dips, and clips ..	60	0	0
6 wires No. 8 plain and 2 barbed	94	0	0
8 anchors and stays at £1 ..	8	0	0
4 gates at £5	20	0	0
Erecting at 30s. per chain ..	120	0	0
	£374	0	0

The difference in favour of the Hunter fence is £116 per mile, though the saving would probably be greater because depreciation and maintenance are less. The cost of erection on another length of this fence erected elsewhere was 22 per cent. less than with the conventional-type fence.

Hints on Erection

Do not strain the fence too much immediately after erection. Over-strain will reduce the strength of the wire, and footed posts will be much firmer the next time the fence is strained, as the ground will have consolidated.

Fig. 4 demonstrates the method of clipping on the chains using a patent clip. No pliers are required. It is suggested that the gauge of the fence should be worked out to synchronise with the links in the chain. Mr. Hunter prefers an 8-wire fence and uses the following spacings from the bottom wire, which is 5in. from the ground: 4½in., 4½in., 4½in., 4½in., 6in., 6in., 7½in., a total of 3ft. 6½in.

It is advisable to carry a gauge which can be hooked on to the fence such as the one shown in Fig. 5. When fastening the batten chains it is a good plan to reduce the gauge slightly so that when the clips are fastened the chain between the wires is pulled tight. Should difficulty be experienced with the gauge of concrete posts, it is always possible to affix a 9-gauge chain to the post and clip the wires on in the ordinary way. Barbed wire should not be used on the top, as this wire must have sufficient strength to hold the strain and maintain a straight top line without sag. The chain batten will not hold the top wire up or bottom wire down, but with the top wire appearance is the main thing. It is only lambs under 2 months which will try to go through under the bottom wire. However, sufficient battens can be anchored to the ground to stop this if necessary. As the life of the anchor chains used in dips and on the flat in place of posts depends on the wire from the chain to the foot, the durability of the material used for this wire is important. Stainless steel or copper wire appears to be best for this purpose. Both should be insulated from the galvanised chain with a small section of rubber or plastic tubing to prevent corrosion between the copper or stainless steel and the galvanised chain.

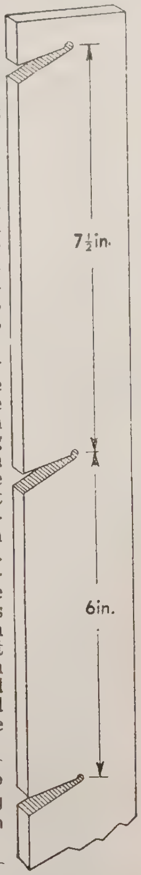


Fig. 5 (right)—Suitable gauge for use in spacing wire while clipping on chains.

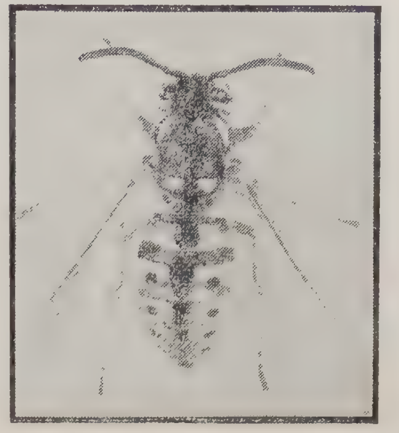
The fence devised by Mr. Hunter has certain definite advantages, which can be listed briefly as follows:—

1. The batten materials used are more durable than those in the conventional post-and-wire fence.
2. The materials are likely to be more easily obtained than wooden droppers.
3. The ability to anchor portions of the fence results in a reduction in posts required and therefore in cost of materials and cost of erection.
4. The method of construction reduces wear and therefore maintenance, at the same time maintaining or even improving upon the stock-holding capacity of standard fencing.

Combating Wasps in New Zealand

By C. R. PATERSON, Apiary Instructor, Department of Agriculture, Hamilton, and C. R. THOMAS, Plant Diseases Division, Department of Scientific and Industrial Research, Auckland.

WASPS of the species *Vespula germanica* were first discovered in New Zealand in the Waikato district several years ago. These wasps, which are common in England and European countries, appear to have become permanently established in the central part of the North Island in spite of all measures taken to eradicate them. Their control, however, is desirable, as there will be seasons favourable to their establishment when they may become a nuisance to the public, especially to domestic fruit growers and beekeepers. Every endeavour should be made to locate nests and to destroy them, and to assist in this destruction the Department of Agriculture will issue 10 per cent. D.D.T. powder free on application.



A queen wasp of the *Vespula germanica* species, showing the distinctive markings, which are black on bright yellow body.

EXPERIENCE gained over the last 5 years in a close study of the wasp *Vespula germanica* (previously *Vespa germanica*) has shown that it is practically impossible to eradicate once it has become established in a district. It is also unfortunate that its spread to other districts cannot be controlled because of the many ways hibernating queens may be carried about.

Queens have been found in raincoats, packing cases, trucks of coal, logs, trucks of timber, wire holes in concrete fencing posts, muslin covering on rolls of bacon, bundles of sacks, and even travelling cases. Flying queens before and after hibernation may also be wind-borne for a considerable distance into new territory.

Wasp nest exposed by digging away a bank.

An effective control can be carried out if the public will destroy all nests discovered and kill any queens that may be found in hibernation or on the wing.

Life History

It is desirable that the life history of the wasp should be understood.

Young queen wasps of the species *Vespula germanica* are raised in autumn, and after mating they hibernate singly or in groups in dark, sheltered corners. With the exception of newly emerged young queens, all the community, including old queens, die in autumn and the old nests are abandoned. However, a small percentage of these nests remain active throughout winter, and it is the inhabitants of these over-wintered nests that cause a considerable amount of concern to beekeepers.

In spring the young queen awakens and immediately searches for a suitable place (usually a cavity in a dry earth bank) to begin building her nest. The wasps protect their many tiers of brood cells by building a bag of several layers of fragile paper made from wood pulp prepared by their jaws and placed securely in position. Only a few cells made of the papery material are built at first and a single egg is laid in each. When these eggs hatch the resulting grubs are fed by the queen on a diet of masticated insects of all kinds, including flies and caterpillars, which she catches herself. As each grub grows, the queen builds up the cell walls hexagonally and also begins other cells round them in which more eggs are deposited.

Worker Wasps Emerge

About 28 days after the first eggs are laid worker wasps emerge from the cells. The new arrivals enlarge the nest, build additional new combs, and extend the paper walls sufficiently to develop second and subsequent batches of larvae. Worker wasps develop in rapid succession, and soon the queen has a large army of assistants and is relieved of all her earlier duties except that of egg laying. As the nest is enlarged the worker wasps excavate to provide adequate room. This work is done with their mandibles and the bulk of the spoil is carried out and dumped well away from the entrance. All the new arrivals are workers (imperfect females) until late in the season or in early autumn, when numbers of males and young queens are produced.

Surplus Workers

Throughout spring and early summer they feed almost exclusively on other insects, but by February, when the nest has become well established, there are usually more workers than are necessary to maintain the normal economy of the nest. At this

COMBATING WASPS IN NEW ZEALAND

Chemical powder being blown into a wasp nest in a bank. To load the tube with the powder it is looped and the powder dropped into the end opposite that inserted into the mouth.

time and until late in the autumn before the workers, males, and the old queen die, these wasps, because of their fondness for sweets, including jam and ripe fruit juices, become a great nuisance to housewives and beekeepers and in home orchards.

Beehives receive considerable attention from these wasps and any weak colonies are likely to be slowly robbed of their honey. The wasps do not store honey or other sweets in their nests, as no food is required for consumption in winter. By May, when the young queens bred in autumn leave the nest and fly away to hibernate, there is a decided slackening off in the activity of the wasps.

The outside paper covering of the ordinary wasp nest is light greyish. Nests may be located by watching the regular flight of the wasps in any direction, especially near ground level or toward the entrance to a hole in the ground. The sides of an earth bank where conditions are likely to be fairly dry are favoured for the building of nests.

Wasp nest, showing tiers of combs.

Unlike the honey bee, which dies once it loses its sting, the female wasp can sting repeatedly. It is unfortunate that these insects have become established in New Zealand, and though they are regarded in other countries as being more a nuisance than a pest, in New Zealand it is desirable to control them. That can be done only by the vigilance and prompt action of the public in locating nests and by suitable arrangements for their destruction.

Where to Look for Hibernating Queens

As each nest left undestroyed may produce hundreds of queens in autumn, it is worth while knowing where to look for queens once they have gone into hibernation. The following are some of the places favoured by these queens:—

1. Underneath loose bark on semi-decayed trees. In 1948 around Hamilton thousands of queen wasps were discovered in such hibernating places.
2. Under sacks hanging on a fence or piles of sacks in a shed.
3. Underneath tile roofs or between roofing iron and sarking.
4. Under stack covers.
5. In coats or clothing hanging up in open sheds.
6. Under piles of stacked timber.

Where to Look for Nests

Nests can be found in a great variety of places, sometimes even in buildings. Gullies, river-banks, and drains appear to offer the most suitable places for the queens to begin a nest in spring. Although a nest may be several feet long, the only indication that it exists is a small opening (about 2in. in diameter) from which wasps can be seen coming and going. Because these small openings are very difficult to find, the observer has to be guided by the flight of the wasps to a particular spot. It is surprising how many nests can be located by watching carefully and then following the main direction of flight until a point is reached where it is quite easy to see them entering a hole in the ground.

Control Measures

Much experimental work has been carried out in an endeavour to improve the control measures used in the past, but at present the only effective means of control appears to be based on the destruction of queen wasps and established nests before queens have had time to hatch out.

Queens can be caught easily during hibernation. While flying around in spring, they can be knocked down with a fly swat or tennis racket.

Nests once discovered can be dealt with by dusting D.D.T. powder well into the opening. It has been found that unless a nest has been disturbed previously powder can be applied quickly with very little risk of the operator's being stung. The application of this powder can be made during the daytime, when the wasps are flying in and out, or it may be left until evening, when activity has quietened down.

For D.D.T. to be effective it is essential that it should be well distributed inside the opening, because the wasps must come in contact with the powder. A second application is sometimes needed a week or so later where the wasps have found a track out which is free of D.D.T. Applying the powder by a tube as illustrated gives efficient distribution. If the tube is loaded before approaching the nest, only a second or two is required to administer the dose. Hundreds of nests have been treated in this manner without operators being stung.

To assist the public in the destruction of every possible nest the Department of Agriculture will issue free a supply of 10 per cent. D.D.T. powder to anyone notifying nests. Supplies and information will be available from the nearest office of the Department.

The public should endeavour to destroy every nest and should kill hibernating queens immediately. If this is neglected, it is possible that in some seasons wasps will be so numerous that great inconvenience and annoyance may be caused to everyone; their stings are painful, and in autumn they are very persistent in their search for sweets such as jam, ripe fruit, and honey.

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POISONOUS PLANTS IN NEW ZEALAND

THIS is the second section of a series of descriptions of poisonous plants which grow in New Zealand by H. E. Connor, Botanist, Department of Scientific and Industrial Research, Wellington. Glossaries to be used with the series were published with the first section, which appeared in last month's "Journal".

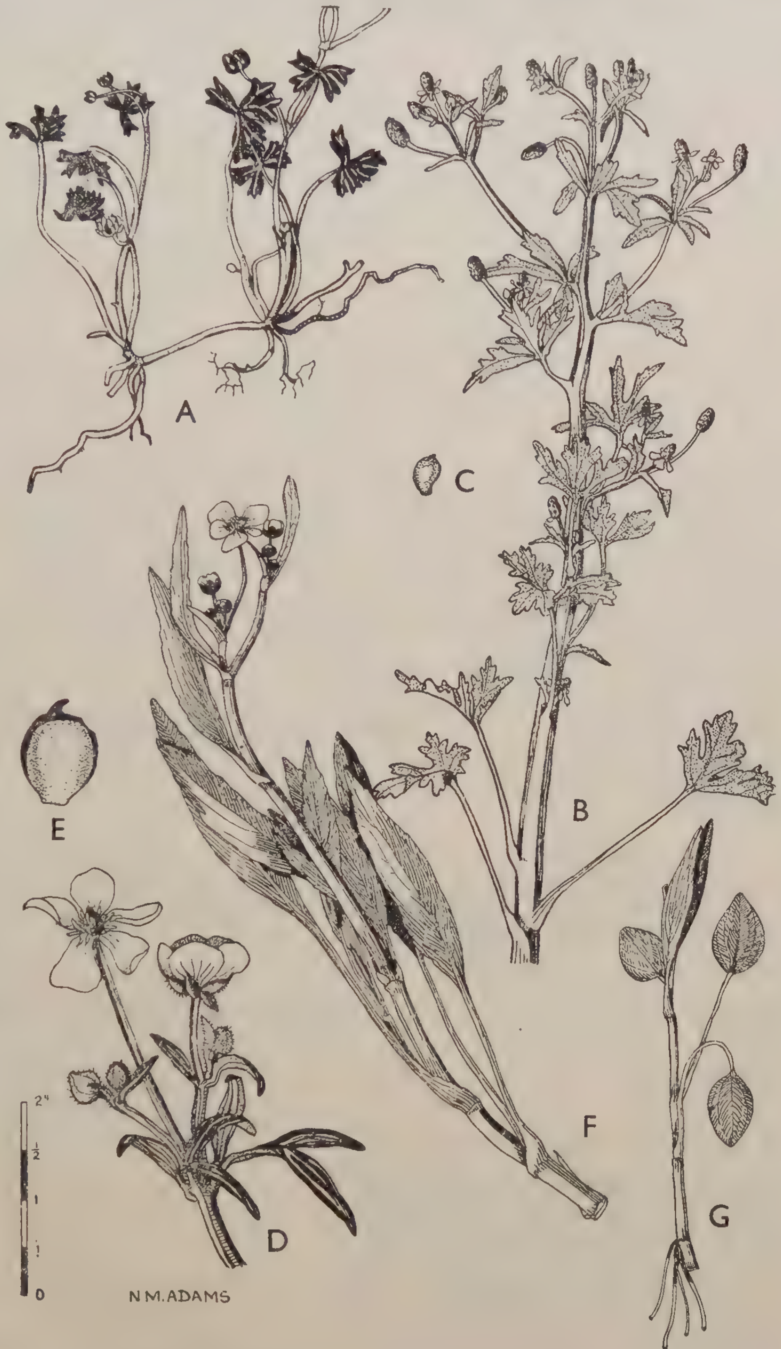

Fig. 2—A: Waoriki (*Ranunculus rivularis*). B (habit) and C (achene, 2½ times natural size) of celery-leaved buttercup (*Ranunculus sceleratus*). D (habit) and E (achene, 2½ times natural size) of creeping buttercup (*Ranunculus repens*). F (habit) and G (submerged leaves) of lesser spearwort (*Ranunculus flammula*).

DICOTYLEDONS

Ranunculaceae

Lesser Spearwort. *Ranunculus flammula* **L. (Fig. 2, F and G)**

Botanical description: Habit—Herb with erect or ascending stems. **Leaves**—Basal leaves sheathing, blades elliptic to obovate; upper leaves sheathing, nearly ovate to nearly linear. **Flowers**—Bright yellow. **Fruit**—Swollen and slightly beaked achenes. (Eurasia.)

Habitat: Ditches, wet places, and pastures.

Distribution: Rather sparingly as far south as Timaru.

General: Lesser spearwort has been suspected of poisoning sheep in Te Awamutu, and in England has repeatedly proved fatal to horses and cattle. *R. flammula* is considered to be as toxic as *R. sceleratus* (celery-leaved buttercup). The toxin is destroyed by drying.

Symptoms of poisoning: Irritation of the mucous membrane and inflammation of the intestinal tract.

Poisonous principle: The toxin in *R. flammula* is protoanemonin.

Creeping Buttercup. *Ranunculus repens* **L. (Fig. 2, D and E)**

Botanical description: Habit—Herb; rooting at nodes; flowering stems hairy, up to 30in. long. **Leaves**—Leaf blades divided into 3, segments 3-parted, coarsely and deeply toothed. **Flowers**—Deep yellow. **Fruit**—Compressed and minutely pitted achenes. (Eurasia and North Africa.)

Habitat: Damp pastures and waste places.

Distribution: Plentiful throughout New Zealand.

General: Doubt exists about the toxicity of this species. Creeping buttercup, like other *Ranunculus* species, is claimed to be toxic, but it is suggested that "it is scarcely, if at all, injurious". In the spring of 1942 and 1943 cows were found dead at the Mount Peel Station, and as creeping buttercup was abundant it was suspected as the cause. The post-mortem examination symptoms also suggested *Ranunculus* poisoning.

Symptoms of poisoning: Post-mortem—Acute inflammation of the small intestine and the abomasum; the blind gut less inflamed.

Poisonous principle: Protoanemonin is present in creeping buttercup and is the toxin.

Waoriki. *Ranunculus rivularis.* **Banks et Sol. ex D.C. (Fig. 2, A)**

Botanical description: Habit—Herb; stems creeping, often branched and forming broad, matted patches, rooting at nodes. **Leaves**—On slender petioles; blades ¼ to 1½in. in diameter, ovate, semi-circular or kidney shaped in outline, usually divided 3 to 7 times. **Flowers**—Yellow, ¼ to ¾in. in diameter. **Fruit**—A turgid achene with a straight or recurved beak. This plant is exceedingly variable. (New Zealand and Australia.)

Habitat: Near swamps, creeks, and damp places.

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Distribution: Abundant in North, South, and Stewart Islands from sea level to 3000ft.

General: Instances of poisoning are frequently attributed to this plant, which is the most toxic of the known poisonous native species of *Ranunculus.* Most losses of stock are reported from the northernmost part of the North Island, where cattle are most frequently poisoned. Waoriki has been shown to be lethal when experimentally dosed to sheep. The whole of the plant is toxic and is suspected to be more so in spring. Toxicity is lost on drying. Losses among stock also occur in Australia from this species.

Symptoms of poisoning: The ante-mortem symptom is colic. Post-mortem examination of sheep shows a fair degree of congestion and ulceration of the wall of the rumen and marked ulceration on the wall of the fourth stomach. Inflammation extends down into the small intestine.

Poisonous principle: An irritant toxin is present in the plant.

Celery-leaved Buttercup. *Ranunculus sceleratus* **L. (Fig. 2, B and C)**

Botanical description: Habit—Annual herb with erect stems up to 30in. high. **Leaves**—On long petioles, blades 3-lobed. **Flowers**—Petals yellow, a little longer than the reflexed sepals. **Fruit**—Achenes, hardly beaked. (Eurasia and North Africa.)

Habitat: Ditches and waste places.

Distribution: Rather plentiful throughout New Zealand.

General: Celery-leaved buttercup is regarded as the most toxic of the buttercups, but in New Zealand is not responsible for as many deaths as waoriki. It is poisonous to all stock, though more dangerous to cattle. Celery-leaved buttercup has been suspected of poisoning sheep in the Christchurch district. The whole of the plant is poisonous. The toxin is destroyed on drying, so that celery-leaved buttercup included in hay is non-toxic.

Symptoms of poisoning: The first ante-mortem symptoms are those of gastro-enteritis, colic, nausea, vomiting, salivation, blackened faeces, and sometimes haematuria. Symptoms include retardation of pulse, slow and stertorous breathing, difficulty in mastication and drinking, and blindness. If large quantities of the plant are eaten, there may be convulsions; when these occur death usually follows within 12 hours. Post-mortem symptoms consist of inflammatory lesions of the alimentary tract, particularly of the intestines.

Poisonous principle: A volatile, acrid, bitter, irritant substance, protoanemonin, is present in all parts of the plant except the seeds.

Polygonaceae

Sour Dock. *Rumex acetosa* **L. (Fig. 3, F to I)**

Botanical description: Habit—Herb with stems up to 30in. tall; stipules united to form an elongate tube. **Leaves**—Oblong, arrow shaped, and rather thick. **Flowers**—Unisexual; enlarged tepals, roundish, heart shaped, and with minute wart-like growths; outer tepals reflexed. (Eurasia.)

Habitat: Waste places and pastures.

Distribution: Occasional in both islands.

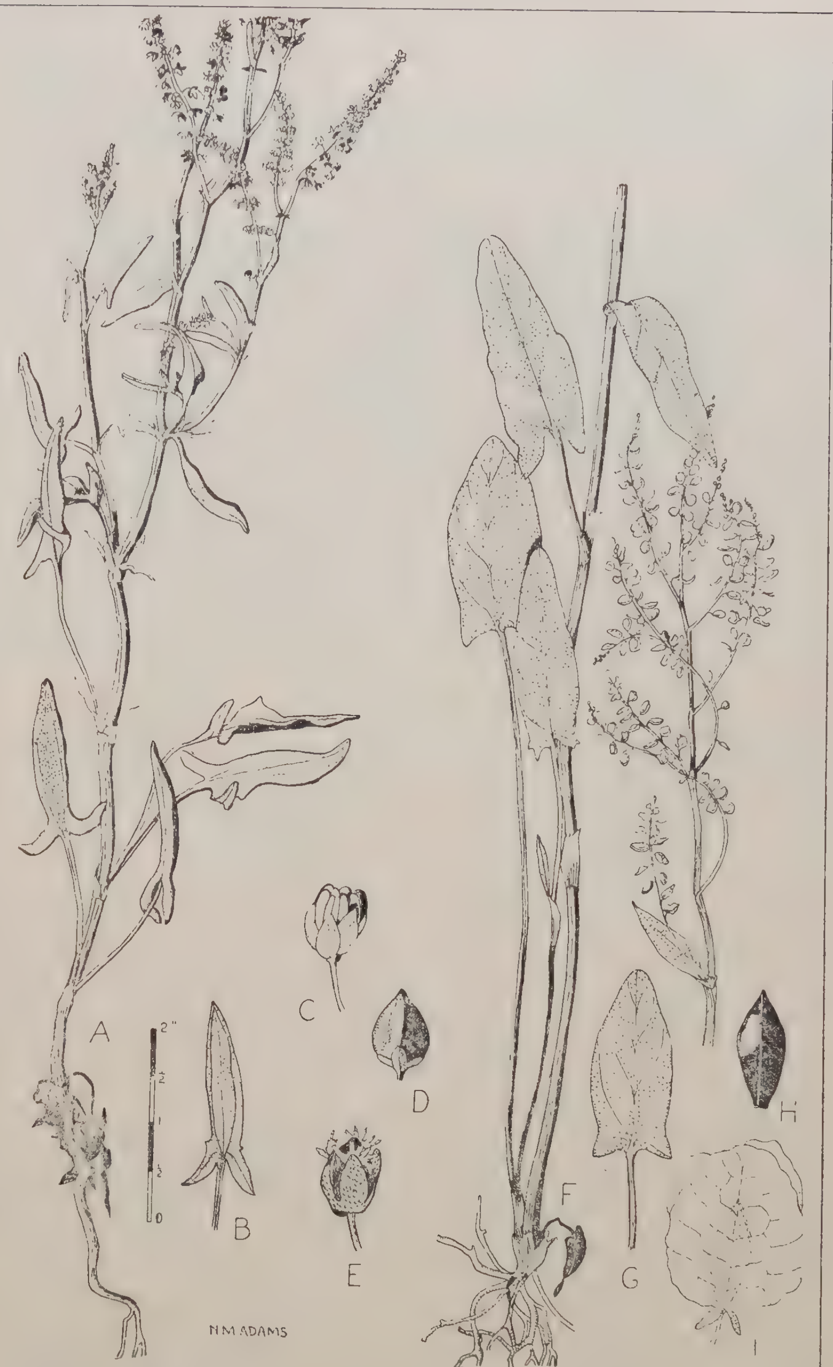


Fig. 3—A (habit), B (leaf), C (male flower), D (nut), and E (female flower) of sheep sorrel (*Rumex acetosella*). F (habit), G (leaf), H (nut), and I (nut enclosed by persistent tepals) of sour dock (*Rumex acetosa*).

General: Sour-dock poisoning is not common either in New Zealand or abroad, but isolated losses were reported in New Zealand before 1936. In Canterbury during the spring of 1936 ewes with lambs 5 to 8 weeks old were poisoned by sour dock; about 10 per cent. of the ewes affected died, the others being treated and recovering. Poisoning usually occurs only in spring and summer. Lactating ewes are especially affected. Symptoms of poisoning result from a reduction of blood calcium caused by its precipitation by soluble oxalates. A solution made by heating 20oz. of calcium gluconate, 5oz. of boric acid, and 100oz. of water, given in injections of about 100 c.c., proved effective in the 1936 outbreak. This remedy confirms the type of poisoning. The lambs grazing with the ewes are not affected.

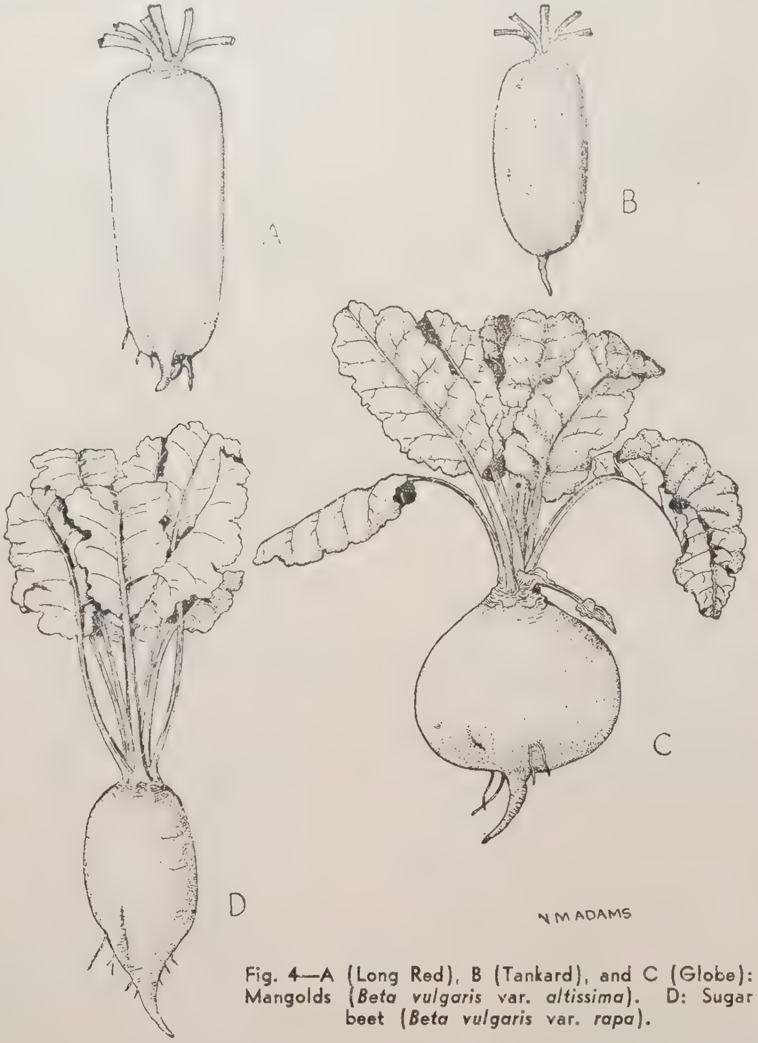


Fig. 4—A (Long Red), B (Tankard), and C (Globe): Mangolds (*Beta vulgaris* var. *altissima*). D: Sugar beet (*Beta vulgaris* var. *rapa*).

Symptoms of poisoning: The cases referred to show staggering as the first noticeable ante-mortem symptom. If the poisoning is serious, the animals go down and in most cases cannot get up. There is frequently a discharge from the nose. Muscular spasms are common, breathing is abnormal, the animal finally becomes comatose, and unless it is treated death follows. Post-mortem examination shows slight inflammation.

Poisonous principle: The toxin is oxalic acid and soluble oxalates.

Sheep Sorrel. *Rumex acetosella* **L. (Fig. 3, A to E)**

Botanical description: Habit—Herb with stem up to 15in. tall; united stipules fringed with fine teeth. **Leaves**—Spear shaped, lanceolate to linear. **Flowers**—Unisexual; tepals ovate, hardly enlarged in fruit, appressed to fruit. (Eurasia.)

Habitat: Cultivated and waste land, open pastures, and low tussock grassland.

Distribution: Abundant throughout both islands.

General: Some authors have claimed that the seeds of sheep sorrel are poisonous to horses and sheep. However, in view of the abundance of this species in New Zealand and the apparent absence of known stock losses caused by it, it is considered that poisonings are not to be expected.

Chenopodiaceae

Sugar Beet. *Beta vulgaris* **L. var.** *altissima* **D.C. (Fig. 4, D)**

Mangold. Mangelwurzel. *Beta vulgaris* **L. var.** *rapa* **Dum. (Fig. 4, A to C)**

Botanical description: Habit—Annual, glabrous, thick-rooted plants; roots of various colours. **Leaves**—Large, alternate, entire. **Flowers**—Perfect, becoming hardened in fruit. Seeds cohere into a seed ball. (Europe.)

Habitat and distribution: Cultivated crops.

General, mangolds: Mangold poisoning is not common in New Zealand, though several cases have been reported. A serious loss occurred on a piggery in Otago where 200 pigs died after being fed cooked, freshly pulled mangolds. It was shown later that clamped mangolds cooked at a temperature below boiling point or at boiling point for too short a time could also be poisonous. Cooking mangold roots for 2 hours or more at boiling point makes them non-toxic. The suitability of raw, fresh mangolds was not considered in this work, but it is accepted, possibly erroneously, that frosted mangolds are poisonous to stock. In New Zealand cows have been poisoned by eating mangolds.

General, sugar beet: Recorded cases show that sugar-beet pulp can cause poisonings in cattle. This type of poisoning is not known in New Zealand, but should be considered, as sugar beet is being grown to an increasing extent in the Dominion. Cases are on record of fresh sugar-beet leaves being poisonous to cattle and pigs in Austria and Sweden, where the leaves are commonly fed. Some authors believe that small quantities of leaves will not produce any ill effects in stock, but that larger amounts may cause death. Several authors have advocated the feeding of sugar-beet tops to stock as an accessory fodder. The presence of oxalic acid in the leaves makes the plant a potential danger to stock.

Symptoms of mangold poisoning: Ante-mortem—In the pig poisonings observed death occurred rapidly, but in a number of cases symptoms of pain were shown. Muscular weakness was followed by laboured respiration, and death ensued from asphyxiation, usually preceded by convulsions. Vomiting occurred in a number of cases. **Post-mortem**—External signs were a cyanotic appearance of visible mucous membranes and a marked paleness of the skin in the region of the snout and coronets. The viscera showed marked venous dilation of visible mesenteric blood vessels. The liver and kidneys were dark red and congested, the stomach and small intestine had an inflamed appearance, and the lungs were abnormally red, showing marked venous congestion. The blood was a chocolate colour, resulting from the change of haemoglobin to methaemoglobin.

Symptoms of sugar-beet poisoning: Roots—Staggers and bloat are the symptoms recorded in bullocks poisoned. Impaction of the stomach and choking is to be expected in cattle and horses. **Leaves**—The sequence of symptoms in pigs is rapid, appearing soon after a meal of leaves has been finished. Apathy, unwillingness to rise, swaying gait, weakness in hindquarters, muscular tremors, spasms, pale grey skin and snout, weak and accelerated heart action, retching, vomiting, and extreme dyspnoea precede death. Cows show depression and diarrhoea, and death occurs if the feeding of leaves is continued. Post-mortem examination reveals dark brown to black, tar-like blood; coagulation of the blood is retarded.

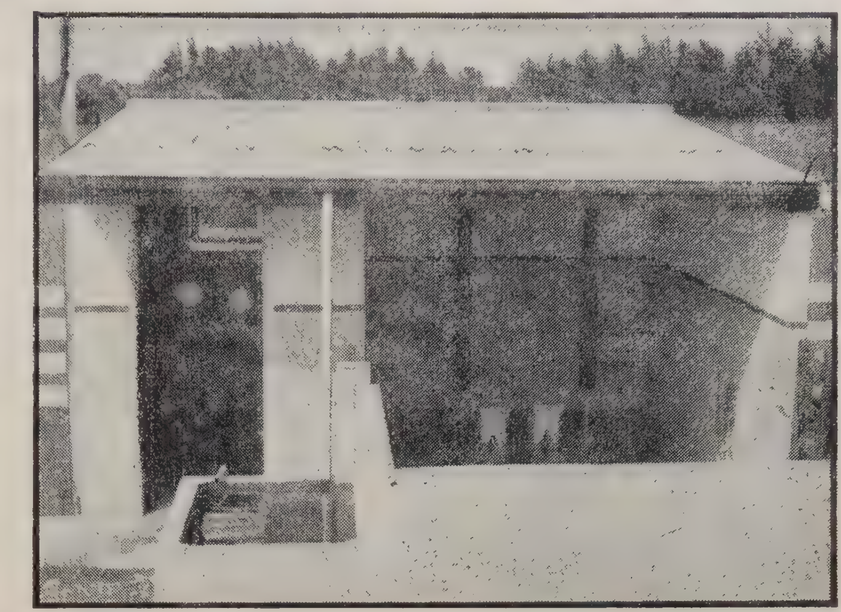
Poisonous principles of mangolds: Excessive amounts of nitrites are present in the roots after they have been cooked at too low a temperature and then allowed to cool.

Poisonous principles of sugar beet: Roots—The fermentation of the sugar present in the roots is presumed to cause the symptoms of bloat. **Leaves**—The toxin in the leaves is oxalic acid and oxalates.

◆

Hygiene in Hand-milking Sheds Supplying Factories

IN the many technical links in the process of butter and cheese manufacture hygiene in the milking shed—both personal and mechanical—is highly important, and it is one factor in the initial stages of dairy-produce manufacture which is controlled solely by farmers. In this article D. I. Bowman, Farm Dairy Instructor, Department of Agriculture, Waimate, discusses aspects of hygiene in sheds where cows are milked by hand for factory supply.


[*Hazledine's Studio Ltd. photo.*

A small hand-milking dairy of the back-out type.

THE hygiene of a milking shed begins in the shed surroundings, so the site must be one which will remain efficient and sanitary no matter what subsequent farm activity or building takes place. Requirements for a dairy site, listed in their order of importance, are:—

A situation at least 50yds. from piggeries, 30ft. from fowlhouses, and 2 chains from a public roadway.

An open space free from dust, cesspools, manure heaps, and drainage from other farm buildings.

A good fall for drainage.

Clean atmosphere and enough sunlight to reduce to a minimum the growth of moulds and fungus.

A good water supply and reasonable proximity to the electric-power supply.

The farm plan should be studied to find a site fulfilling those conditions, and it is advisable to seek the aid of a Farm Dairy Instructor. On small farms a site which incorporates all the desirable factors without much waste of land may not be found easily, but efficient sanitation must be established and maintained throughout the life of the shed.

Well-laid-out, sanitary dairy premises require the minimum of work to keep the shed and equipment in order during the milking season. Printed plans and advice are obtainable from Farm Dairy Instructors of the Department of Agriculture.

Maintenance of Surroundings

If a milking shed is built at least the minimum specified distances from piggeries and fowlhouses, the likelihood of contamination from these sources is reduced to a minimum provided ordinary care is taken.

Dust, manure heaps, and cesspools will not exist while a shed is new and the surroundings are in good order, but neglect and indiscriminate wandering of stock about the premises will soon provide a source of contamination. Mud caused by animals being herded becomes in summer contaminating dust which blows into the shed through its ventilation. This dust will contaminate the milk and strike one of the first blows at the quality of the produce.

Access by stock to the cowshed should be controlled by fenced concrete races to and from the night and day pastures, and this factor should be considered when the shed site is chosen. The perfect arrangement of stock direction provides a grassed surrounding at all times, obviating dust in summer and odorous cesspools in winter. The concrete races should be designed to suit the conditions on the farm. They afford very efficient sanitary control, and to seek advice from the Dairy Division on this subject is well worth while.

If a good, sound dairy shed has been built in the centre of much farmyard activity, and therefore is open to numerous sources of contamination, it may be possible to rectify the position by replanning some of the farmyard arrangements. Renovation and alteration often are not as expensive as they may have appeared. The first objective would be to establish as large a grass area as possible around the shed. Piggeries and fowlhouses which are too close must be shifted, all manure heaps and odorous objects removed, drainage reorganised if necessary, and provision made for control of access by stock. Shed ventilation may need to be modernised, drainage examined, and broken concrete refaced. Woodwork should be examined for evidence of borer, as borer dust may fall into the milk. The existing shed may be found ideal for another farm building the erection of which is contemplated, and in such circumstances selecting a new site for a new shed may be more economic.

Air-borne infection of dairy produce on farms caused by unhygienic shed sites is a serious problem and one that farmers must be prepared to eliminate.

Dangers of Dust

A shed with dusty interior and surroundings is not safe even on the calmest of days. Some farmers say: "We milk here only on wet days and use the grass paddock during fine weather". Wet days often are windy, and the dust danger is always present. Dust cannot be kept from settling in the milk and open buckets in such a shed, and such conditions cause a vast amount of irreparable damage to New Zealand dairy produce. Warm milk is an excellent medium for growing bacteria, and germs from cowshed dust are highly undesirable.

A dusty shed cannot be kept clean. For example, between milkings all the dairy equipment will become coated with fine dust deposited from the air, so each successive milking deposits its share of contamination in the cream can. Apart from that, where there is dust there is odour, and grade quality is affected by absorption of foreign odours.

Preparation of Cows for Milking

While the cow is roaming the paddocks between milkings much dust and bacteria-laden material is deposited on its body, so the flanks and legs near the udder must be cleaned as much as possible. Some types of household scrubbing brush are excellent to clean this area down, only moderate pressure being used on the udder. The udder should then be washed with clean, warm water and dried with a clean cloth. No open milk buckets should be left in the vicinity during the brushing and washing treatment, as they are sure to collect some of the dust and splashes. Apart from its virtue of cleanliness, gentle brushing and warm-water washing of the udder aids the letting down of milk. The tail of the cow should be prevented from waving about and, if necessary, the animal comfortably leg-roped.

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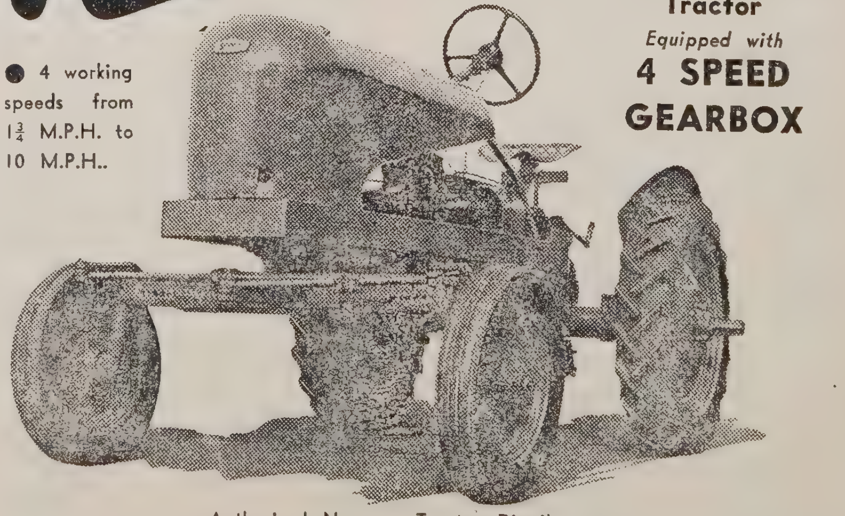

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When a cow has been milked the milk should be removed immediately to the milk-house or dairy. If the bucket is put down while a cover is thrown on the animal, shed and body dust will be distributed, resulting in contamination of the milk.

Cloths used for udder washing should be non-woolly, kept for the one purpose, and boiled for 15 minutes daily. A piece of an old coat or sack or some dirty old rag is most unsuitable for this operation.

Use and Misuse of Teat Salves

The dairyman with a herd of cows under his care will certainly find the use of teat salves necessary sometimes for the treatment of teat and udder complaints. Most medicated salves are highly odorous and therefore dangerous to milk quality, and their use is prohibited by the Dairy Produce Regulations. Cows under treatment should have their udders cleansed of all salve before being milked and be treated again before being turned out. Such cows are best milked last.

Some milkers like to use a lubricant to facilitate hand milking. Odourless salves are manufactured for this purpose, but as little as possible should be used. Milk and cream absorb odours as blotting paper does ink, and serious taints can be given to dairy produce by the careless use of odorous salves. Milk should never be used as a milking lubricant.

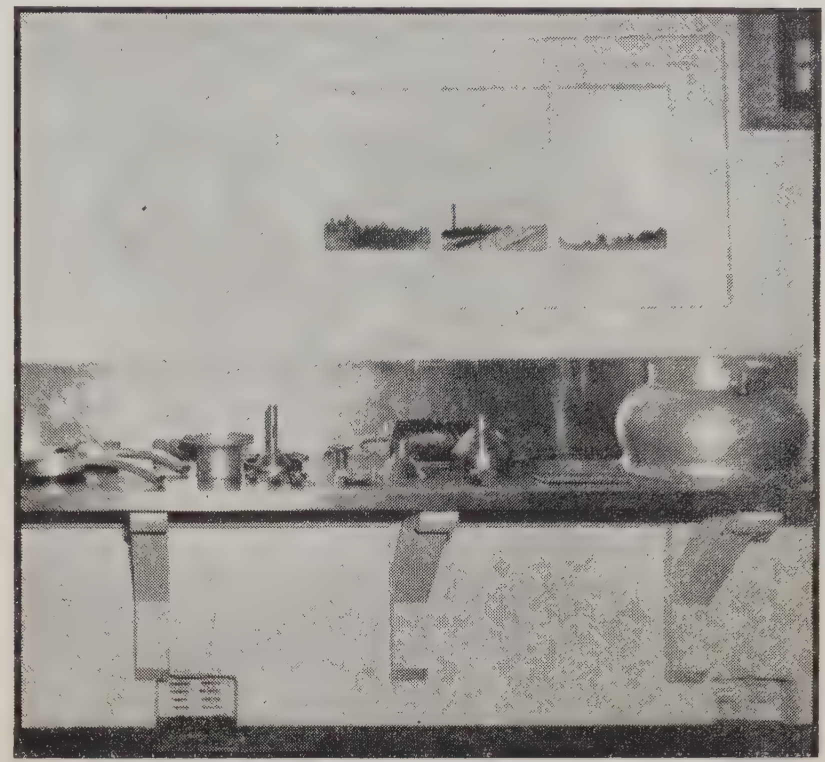
Cleaning Equipment

The cream separator is a machine of many metal parts, some of which come into direct contact with the milk. It is very important that it be thoroughly cleaned twice daily.

A separator must be taken apart to be cleaned; no amount of flushing can possibly clean it. The practice of running a kettle of boiling water through the machine after one milking and taking it apart after the next is hygienically wrong and worse than not touching it at all. In every separator a slime is deposited on the inside of the bowl cover by centrifugal force. Hot water bakes the solids from milk on to the tinware and, as high temperatures greatly facilitate bacterial growth, a first-class incubation device for growing all the unwanted bacteria is formed. A separator bowl so treated will remain hot for hours, gaining every minute millions of contaminating germs to be washed into the cream can by the milk from the following milking.

Dairy tinware should be cleaned not with cloths but with the correct brushes, which factories can supply. The correct procedure with all dairy tinware, including separator discs and bowl pieces, is first to scrub it with a brush in cold or lukewarm water, a process which cuts the milk from the tinned surface very efficiently; next, to scrub all parts with reasonably hot water containing washing soda; and, last, and most important, to immerse all the tinware in boiling water and lay it out on a convenient rack away from dust to dry by its own heat.

Buckets, metal cream stirrers, cream-collecting receptacles, and cans should all be washed and scalded by the same method, and brushes should be washed and placed in the sun to harden.



A separator must be taken apart for cleaning, for no amount of flushing can clean it.

A rule always to be observed in cleaning tinware is to wash it with cold water before hot to minimise the baking of milk solids on to the tinware. The scalding water must be boiling or all tinware will be left with a fat deposit and a greasy feel; this grease film is laden with bacteria and fatty acids which contaminate milk.

Design of Tinware

The ideal dairy tinware would be glass-smooth, of simple construction, and as nearly cornerless as possible.

Scratched, pitted, or rusted metal surfaces provide lodging places for bacteria and reduce the ease of cleaning. Such faults should be remedied by replacement or retinning as soon as they appear. Galvanised buckets and receptacles are totally unsuitable for dairy use because their surfaces are rough and subject to a chemical action between milk acids and the galvanising.

The basic metal of much dairy equipment is tinned copper or brass. The surfaces of these metals should be kept well tinned to protect them from the effect of milk acids. Tins in which household products have been canned are quite unsuitable as receptacles for collecting cream. Their metal is of the wrong type and their seams cannot be cleaned. The ideal receptacles for cream collection are made of good glazed crockery, enamelware, stainless steel, or well-tinned and seamless metalware.

Metal surfaces which are brass, copper, or rusty can affect dairy produce by the cumulative incorporation of very small portions of the metals in the cream supply.

Disposal of Skimmed Milk

One of the most odorous and contaminating substances which may influence the hygiene of dairy premises is fermented skimmed milk; therefore the disposal of skimmed milk directly from the separator and with the least possible time lag is most important.

If a large quantity is involved, a pump and pipeline to the piggeries undoubtedly is the most efficient arrangement. The fixtures to the pump to lead in the skimmed milk must be detachable for cleaning, and no galvanised-iron pipe must be used on the suction side of the pump. The pipeline of such apparatus requires similar hygienic attention to milking-machine pipelines. Frequent washing with suitable detergent solutions is necessary, though care must be taken that the washing solution does not reach the pigs. A plug fitting the dairy end of the pipeline to close this opening between milkings prevents gases detrimental to cream from reaching the dairy.

Gravitation methods are not satisfactory for the disposal of skimmed milk because the pipeline cannot be cleaned efficiently. A pump can be used to force cleaning solution through in large quantities, but the pipeline of a gravitation system would always be odorous.

In a small shed clean cans removed after separation is finished provide a satisfactory method of disposing of skimmed milk, but such receptacles must receive the same hygienic cleaning as do dairy utensils and be kept odourless. A receptacle on wheels is also efficient.

Whatever method of disposal is used, accumulation of skimmed milk from successive milkings is highly undesirable. Under such conditions skimmed milk sours and ferments quickly and will cause contamination by air-borne inducement of the bacteria of fermentation, as well as attracting house flies.

Cooling of Cream

The bacterial content of milk from a normal, healthy cow at the moment of milking is quite low, but after milking rapid germination of contaminating bacteria begins; hence the importance of each link in the chain of control the farmer exercises in the care of milk and cream on the farm.

For control of germ growth all sources of contamination must be eliminated. If the shed is very dirty, a highly sanitary milk-house next door cannot be effective, for irreparable damage would be done to the cream in the shed portion of the premises. The object of keeping a dairy scrupulously clean would be defeated by habitually neglecting to wash the separator twice daily. An odorous skimmed-milk bucket where all else was clean would neutralise much of the good work done in other directions.

When the cans arrive from the factory they should be sterilised with boiling water and placed canted on a rack with their lids off to dry out by their own heat.

The cream should be cooled from the separator by an efficient cooler fed by a cold water supply, artesian for preference. Luke-warm water from an overhead sun-heated tank is useless in a cream cooler. Reducing the temperature of cream at the moment of separation effectively controls bacterial growth, and therefore some method of mechanical cooling is most desirable. The temperature of the cream or milk should be reduced to 65 degrees F., or lower if possible.

Cream from a small dairy can be cooled by being stood in cold water, but the surrounding water must be cold and in ample quantity, and the cream must be stirred with a metal stirrer until it is cool. A small quantity of cream can be cooled quickly and efficiently in this manner, which is certainly better than leaving it to be cooled by the air. However, leaving cream to stand in cold water without stirring it or paying attention to the water temperature is almost useless; the water near the cream receptacle rises in temperature and the cream cools slowly from the outside inward, leaving that in the centre still warm.

Cooling of cream or milk aerates the liquid and helps to liberate the volatile gases and animal odour sometimes present.

Collection of Cream

Though hot and cold cream should never be mixed, the contents should be stirred every time cream is added to the can, which should be covered with clean, loosely woven linen or gauze.

If the stirrer is left in the can, yellow scale is likely to form on the shaft and fall into the cream. A wooden stirrer should not be used, because butterfat completely permeates the wood and the stirrer then causes contamination by introducing the bacteria of rancidity and fermentation into the cream, with the same effect as adding yeast to dough in bread making.

The consistency of cream for delivery to the factory during hot weather should be about that of well-mixed paint and the cream should contain not more than 45 per cent. of fat, a safe range being 42 to 45 per cent. In a liquid of this viscosity agitation during transport is minimised and sampling at the factory is of maximum efficiency. A fat content of 38 to 42 per cent. is recommended during cold weather.

While cream is being held on the farm the can is best stood in cold water, running if possible. Hygiene is best served by keeping the temperature of cream low and storing it in the cleanest of atmospheric conditions.

Roadside Stands

Because of transport difficulties and the demands of farm duties cream from many farms must wait at the roadside for some time. In scattered districts in which collection rounds are restricted the last hour spent by the cream at the gate in the heat of the sun frequently controls the farmer's quality record. Efficient protection from the heat of the sun should be provided to minimise this fault.

Cans delivered and left in the sun for hours become highly unsanitary and should be scalded and placed to cool immediately they have been removed to the dairy.

The adopting of a tradesman-like attitude to dairying on a farm is essential. Every farmer whose routine and technique are developed on a sound hygienic basis must save himself much money over the years and also contribute to economic stability in the industry.

FARM
SAFETY

LOCKING the two brake pedals of a tractor together is advisable when working on hills and essential when working on roads so that when the machine's speed is to be reduced pressure is exerted evenly on the brake drums. It may be argued that as the two brake pedals are close together they may both be depressed by placing the foot down evenly across them. Though that is so if a determined effort is made, in an emergency when the driver stamps on the brakes in a split second he cannot be sure of hitting both pedals evenly and in many cases hits only one; if the tractor is travelling at speed, it will swerve violently to one side, to the danger of humans or animals in its path, or may even overturn. Realising this danger, manufacturers have provided a latch or a pin with which the brake pedals can be locked together. However, even that does not ensure equal pressure on the brake drums, for the linkage mechanism between the pedals and the brake bands may be out of adjustment. Therefore the brakes should be checked regularly to ensure that equal depression of the pedals results in equal pressure on the drums.

When a tractor is used at a high speed the brake pedals should be locked together. The brakes should be checked regularly for wear and even pressure on the drums.

—*C. J. CROSBIE, Farm Machinery Instructor,*
Department of Agriculture, Christchurch.

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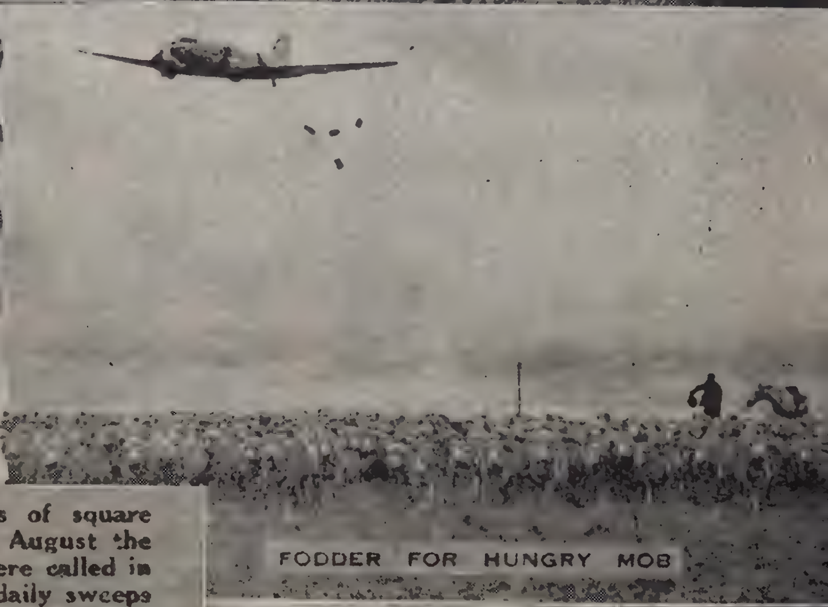
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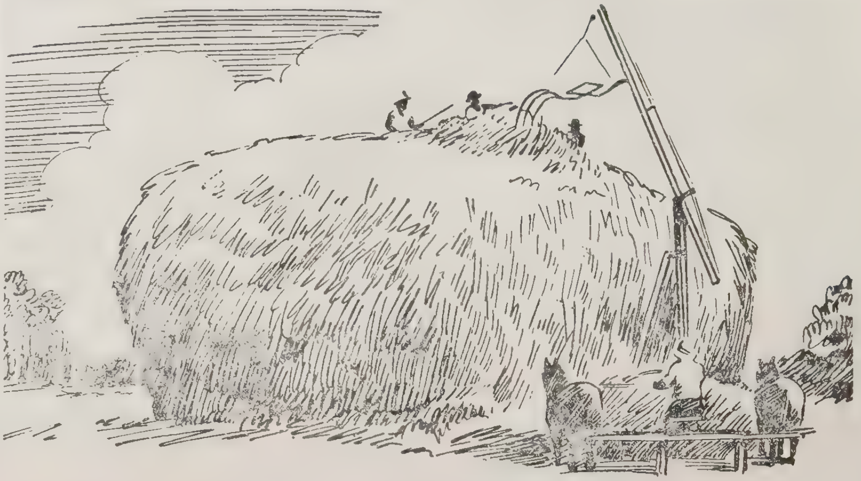

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Establishment of an Apiary : Handling Bees

Seasonal Notes for the Domestic Beekeeper

PERSONS contemplating the establishment of a domestic apiary should first consider whether their home section is a suitable place to keep bees, whether the bees are not likely to become a nuisance to neighbours or to the owner's family, and whether there is sufficient scope for the bees to gather and store surplus crops of honey in addition to the bees' own food requirements. Important points in establishing a domestic apiary are discussed in this article contributed by the Horticulture Division.

ANYONE may become a beekeeper, but only those who are sufficiently interested and thorough and who plan apiary management skilfully can hope to succeed. Honey bees depend for success on favourable floral and climatic conditions and on the attention and care they receive at critical times during the breeding season.

Care and maintenance of good working stock, including timely brood and hive manipulations to ensure a maximum number of worker bees at the beginning of the main honey flow in the locality where the bees are established, is essential.

Before getting bees the beginner should spend as much time as possible with a successful beekeeper during the summer months when bees are being attended to. No attempt should be made by inexperienced persons to establish an apiary, as bad handling of bees by a beginner, especially at times when they should be left alone, may cause an orgy of stinging.

Good strains of honey bees are usually gentle and are not aggressive when properly handled.

Experienced men can handle bees with a minimum of disturbance even under the most trying conditions, but beginners should choose warm sunny days, when the field bees are busy gathering nectar and pollen, for hive examination.

Handling of Bees

There are some principles affecting the handling of bees so that few stings are received. Attention should be paid to dress; clothes should be clean and not made of woolly materials, which bees dislike. The use of gloves is advocated by some beekeepers for protection against stings on the hands, but their use deprives the beekeeper of a deftness of touch to some extent. Any clumsiness in handling combs resulting from covered fingers tends to irritate the bees and make them less easy to control. Further, stings on the gloves or clothing may not be noticed by the operator and may rouse more bees to the attack, which does much to demoralise them generally, so that working conditions become very uncomfortable.

A rubber band around each sleeve cuff, or canvas mittens drawn above the cuffs and tied in place will guard against stings from bees which crawl under the clothing. Trouser bottoms should be secured by the use of cycle clips, rubber bands, or loose canvas spats in which the trouser legs should be tucked. Once confidence is gained in handling bees there are times during the honey season when it is much more comfortable to work with the sleeves rolled up above the elbows.

Use of Bee Smoker Essential

All beekeepers should, however, use a bee smoker and wear a bee veil when working in the apiary. Every motion while manipulating the combs and bees should be smooth and deliberate with as little jarring of the hive parts as possible, if the work is to be put through rapidly with a minimum of disturbance or stings and without unnecessary killing of bees.

The most difficult time to handle bees is during cold weather or immediately following a period of bad weather when they have been confined to the hives for some days. It is also inadvisable to disturb the hives more than is necessary in autumn after the main honey flow ceases.

When to Establish Bees

November is a suitable time for the beginner to establish a domestic apiary in most parts of New Zealand, with the exception of North Auckland areas, where the season is earlier. At this time of year there is usually sufficient nectar available to the bees, so that no artificial feeding, which is tricky, is required.

Where bees are established early in spring there is a danger of stocks being robbed out by neighbouring bees or of colonies dying out because of insufficient stores when brood rearing increases. In purchasing established bees too early in spring there is also the danger that they may have become infected with disease the previous autumn which does not show up in the brood until later when the bees have worked back on to the last of their honey stores. It is much safer for the beginner to wait until late spring or early summer to purchase bees and used hive equipment (which should be thoroughly examined by an experienced beekeeper), as by then sufficient time has elapsed to determine with more certainty whether the bees had picked up infection the previous autumn. However, these precautions are not necessary where a start is made with new hive equipment and nuclei (colonies), complete with sufficient stores to maintain them until the honey flow begins, purchased from a reliable breeder.

Permit Needed

In any case the vender must first obtain a permit from the local Apiary Instructor of the Department of Agriculture to sell bees and any used hive equipment. This precaution is necessary to prevent the possible spread of diseases.

When confidence has been gained an operator will be able to work with his sleeves rolled up.

Particulars of the equipment required to set up an apiary of any size may be obtained from the nearest Apiary Instructor.

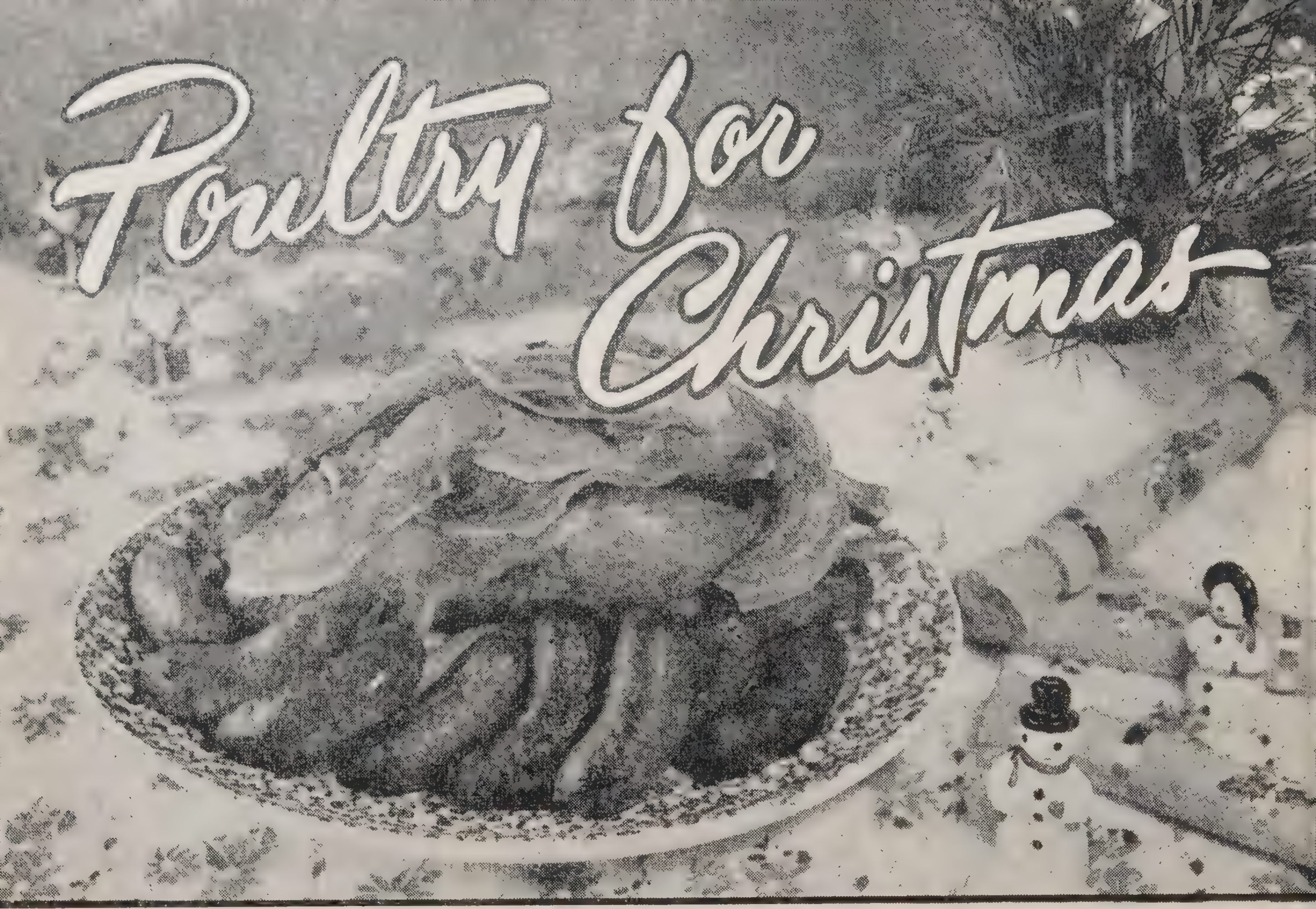
Registration of Apiaries

Unfortunately honey bees like other living creatures are subject to diseases and these may create serious problems for the beekeeper. It would be difficult therefore for even an efficient beekeeper to carry on successfully over a long period without some legal protection against careless neighbours.

To enable the Department of Agriculture to service the beekeeping industry effectively (which includes the control of bee diseases), all apiaries must be registered immediately colonies of bees are established on any location. Forms of application for registration of an apiary may be obtained from any office or Apiary Instructor of the Department. There is no registration fee.

Any person keeping unregistered hives or allowing them to be kept on his land is liable to a fine of £20. Compulsory registration provides the inspector with a complete list of the beekeepers in his district, which is necessary to help him in carrying out inspection work.

Poultry for Christmas



SOME people may consider that the centrepiece of the Christmas feast should be goose or turkey, but for the majority of New Zealanders it is more likely to be lamb or humbler poultry—perhaps a young duck or a tender cockerel, but more often just fowl, a designation which can cover anything from a well-fleshed yearling pullet to an old, scraggy hen. The age of the bird matters less than its quality and the cooking. First step toward a poultry dinner is either the purchase of a ready-dressed bird or the buying or selection of one alive and preparing it for the table; in this article those preparatory stages are explained by W. L. McIver, Poultry Instructor, Department of Agriculture, Hamilton. Good cooking can do a little to improve the poor-quality bird, but poor cooking can ruin the best of meat, so Eva Topping, Rural Sociologist, Department of Agriculture, Auckland, advises on ways to ensure good cooking of good poultry.

The Pekin is a breed of duck widely used as a table bird.

THAT many housewives do not think a Christmas dinner complete without poultry is the more curious because the same wives seldom serve poultry all the rest of the year. The explanation probably is that poultry is regarded as both a luxury meat and a bother to prepare. Yet the festive outlook toward Christmas is so strong that the practice of serving some kind of poultry meat then seems unlikely to die out. For many reasons it is to be hoped that this is correct, for many varieties of poultry can supply the basis for an attractive dinner, but unfortunately many housewives do not realise that poultry need not be a luxury meat or troublesome to prepare.

Admittedly, the purchase price of dressed poultry varies considerably throughout New Zealand and is high in the larger cities. Prices are also affected by the season, for as long as housewives flock to buy poultry for Christmas but not for the rest of the year, Christmas prices will remain high. Prices can be expected to be lowered permanently only if the public creates an increased demand for poultry and the farmer finds competing for the trade worth while. At present, with few exceptions, the farmer and the poulterer do not have to compete for trade because the public is not demanding either the quality or the quantity to warrant competition among suppliers. When that

[*Photographs on this page by Sparrow Industrial Pictures Ltd.*

[*Sparrow Industrial Pictures Ltd. photo.*

Muscovy ducks are a dual-purpose breed and make excellent table birds.

demand does develop farmers will have to rear special poultry for consumers who want young, tender, well-fleshed birds and poulterers will need to make available turkeys, geese, ducks, and fowls attractively dressed, trussed, and wrapped.

Prices vary considerably in New Zealand according to the district, the variety of poultry, and whether the bird is bought alive or dressed. The demand at Christmas for the less-common poultry is great enough to keep prices high for turkeys, geese, and even ducks, and that helps to maintain prices for fowls. Prices of dressed hens charged by poulterers are much the same throughout the country, as the birds are sold mainly on the basis of weight after dressing, but shops in smaller towns tend not to charge maximum allowable prices and prices tend to be lower in the south. Prices in Invercargill are lower than those in Auckland. This trend is even more noticeable in prices of live birds, so that cheaper live poultry can be bought from country than from town farms and from southern than from northern farms.

If price is a factor, poultry should be bought alive and not dressed, but not only townspeople look on plucking and gutting as difficult, a nuisance, and even repugnant. The consumption of poultry on general farms and town properties running a few fowls is much lower than it should be. Home-reared fowls or those bought alive from country farms at reasonable prices compare very favourably with other meats in cost.

Dressing a bird is not difficult. Admittedly, practice is desirable to increase efficiency, but even without frequent practice little time is required to dress a bird provided the general principles are understood. This proviso is important because, though anybody can get the feathers off a bird and take out its inside more or less quickly, few have seen the job well done and know what to do.

Selecting Poultry

When buying dressed poultry from a shop the customer has little chance of using special knowledge to ensure obtaining a reasonably young bird. Very young birds do show special signs, mainly on the shanks, feet, and keel: The keelbone is soft and pliable, not rigid as it is in an old bird, and the scales on the shanks and the skin of the feet are obviously softer. It is better to seek the advice of the poulterer about the quality of older birds; if he states the age of the bird, that information should be accepted with some doubt, because there is no way of telling by appearance whether it is 1, 2, or more years of age.

Weights of Birds

One piece of evidence the customer can use safely is the weight of the dressed carcass in relation to its breed. The better fleshed a bird is the better its eating qualities are likely to be. Average, good-quality, adult birds should dress at the following weights:

Breed	Males (lb.)	Females (lb.)
White Leghorn and other light-breed fowls	4	3¼
Australorp and other heavy-breed fowls	5½	4¼
Khaki Campbell ducks ..	5	4
Pekin ducks	6	5
Turkeys	11	8
Geese	12	9

Many carcasses will weigh more, but that is a good sign. Dressed carcasses which weigh less could still be excellent in quality, but as a rule a heavy bird is a better buy than a light one.

Plucking

The first decision to make is whether to dry or wet pluck the bird. A young bird should be dry plucked, as the skin is soft and tender and tears easily. Turkeys of all ages are very easy to pluck dry. Geese, whether young or old, are the most difficult birds to pluck, with the possible exception of swans; one experience is usually sufficient to teach the amateur that a goose is better plucked by a poulterer. Ducks are not very easy, partly because of the oil in the feathers and the pin-feathers present at certain ages; if the scalding is carried out correctly, ducks are easier to wet pluck, but achieving a successful scald is far more difficult with ducks than with fowls, so the amateur is better advised to dry pluck ducks, even if it takes longer. Fowls can be scalded readily and they wet pluck very easily.

Dry plucking should be started as soon as the bird has been killed. Do

HEAVY BREED - - RHODE ISLAND RED
CROSS-BREED LIGHT X HEAVY
LIGHT BREED - WHITE LEGHORN

[*Fraser Niederer photos*

Poultry for Christmas dinner may imply geese and turkeys to some people, but hens should not be despised for the purpose. If they are well fleshed and properly cooked, they can compare favourably with any other type of poultry as the basis of a meal.

not wait for it to cease kicking, but begin plucking the feathers out immediately after dislocating the neck. Start at the neck end and work back to the tail. Do the breast and keel first, then the back, sides, and legs. Leave the tail and wings until last.

The secret of success in wet plucking is the scald. Many poulterers like the water close to 160 degrees F., but temperatures up to 180 degrees are satisfactory if the time of dipping is reduced. If the bird is dipped too long, the skin will scald too soft and tear as the feathers are plucked, especially on the legs, wings, and breast; if the dipping time is not sufficiently long, the feathers will be just as hard to take out as in dry plucking.

Use a bucket wide and deep enough to permit the bird to be put into it easily. Use sufficient water at about 170 degrees F. to submerge the bird completely. Scalding is best done about 20 and not more than 30 minutes after the bird has been killed. Dip the bird for a couple of seconds, pull it out of the water, and immediately submerge it again, moving it around in the water as much as possible. At the end of 25 seconds pull it out again and test whether the scald is sufficient by pulling one wing feather. If it comes out readily, the scald is right; if not, submerge the bird once more and test again 5 or 6 seconds later.

The order of taking out the feathers is entirely different from that in dry plucking. Do the wings first, then the tail, the legs, the back (working from tail to neck), and last the keel, breast, and abdomen. A few feathers will be missed in the first pluck, but these are attended to in the final "fine" pluck.

Gutting

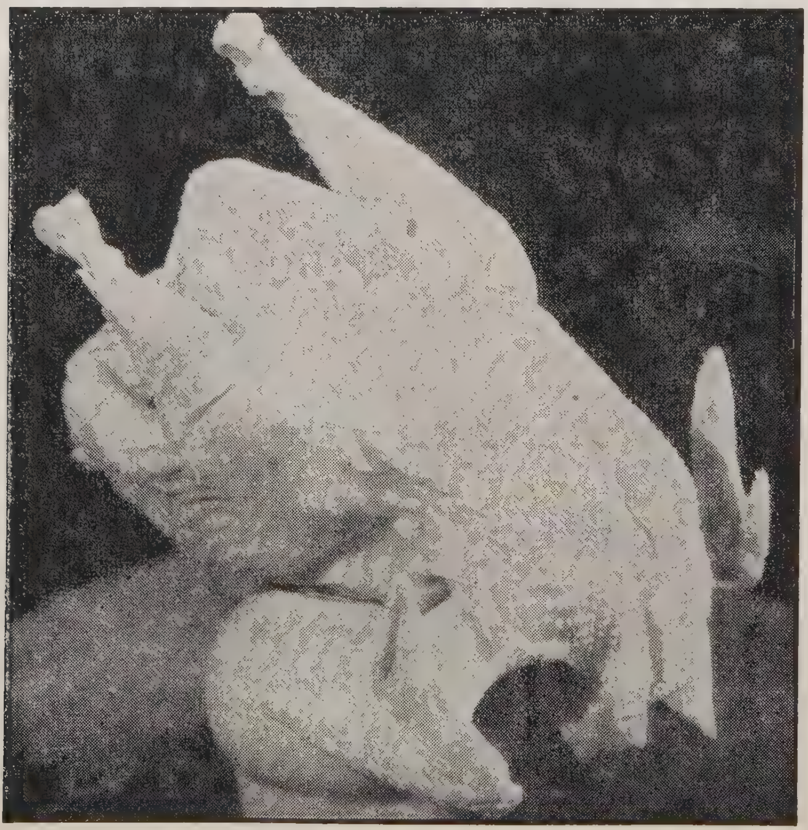
For the person who seldom prepares poultry for the table there are only two aspects to gutting—how to get out the crop and how to cope with the rest of the internal organs.

The crop is best taken out from the neck end.

All the rest of the organs are removed through a cut made in the abdomen. This cut can be made in one of three ways. The most popular is to make a long incision from the end of the keelbone right to the vent. Another way is to make a long cut from side to side across the abdomen, halfway between the keel and the vent. Both these methods make it easy for a person even with large hands to do the job quickly, but they leave an unsightly gap and compel the cook to stitch together the abdominal skin after stuffing the carcass. The roast poultry illustrated on page 476 was gutted by this second method.

In the bird illustrated on the next page the hole through which the gutting was done is so small that it can barely be seen. The leg bone is tucked into the hole, which because of its smallness stops the leg from springing out; this is one method of trussing. This third method of gutting needs only a small stab cut on one side of the abdomen; full details were given on page 437 of the "Journal" for November, 1949. It is a slower way than the other two, but the carcass looks a great deal more attractive both after completion of the job and after being cooked.

Take out the lungs and wash the carcass well, but, if the poultry is not going to be cooked soon, drain and dry it thoroughly. Water does not harm poultry flesh because it is protected by an internal as well as an external skin.



[*Fraser Niederer photo.*

A hen plucked, gutted, and washed ready to be trussed and stuffed.

Old Hens

An old hen should not be despised as a table bird. There are many misconceptions about the old hen. Some people condemn females as table birds, others say second-year birds are tough, and some insist on using only heavy-breed varieties. Neither the age nor the variety matters very much if the bird is well fleshed, especially on the breast, keel, and legs, in which case it can be cooked so that it will be tender and can compare favourably with any other kind of poultry. It is more important to have some idea of the age of the bird, not so much in terms of months or years, but by the classification of young, very young, or not young. The bird should then be cooked according to its classification.

COOKING POULTRY

Chickens and Hens

Very young chickens may be roasted or fried; in fact, they are the only type of bird suitable for frying, as any other would be too tough for this method.

Fried Chicken

Cut the bird into neat serving pieces, dredge them with well-seasoned flour, and fry them in bacon fat until they are tender and golden brown. Do not fry the chicken too quickly or for too long. Serve it with bacon rolls and fried parsley.

Fried Chicken in Batter

1 young chicken, cut into serving pieces
2 eggs
1 tablespoon of melted butter
A little gravy or stock
¼ cup of flour
1 small onion, chopped finely
1 tablespoon of chopped parsley
2 tomatoes
Salt and pepper

Beat the yolks of the eggs and stir in the cooled melted butter, a little gravy, and the flour. Pour in 1 cup of cold water to make a smooth batter and put it aside to set. Whip the egg whites until they are stiff and add them to the batter, also stirring in the parsley and onion. Dredge the pieces of chicken with flour, dip them in the batter, and fry them in hot fat. Drain the fried chicken on soft paper and serve it on a hot dish garnished with parsley, slices of fresh tomato, and small strips of fried bacon.

Roast Chicken

Young chickens or birds which have just reached maturity are best for roasting. After being dressed the bird can be stuffed at the crop and in the body cavity with one of the stuffings for which recipes are given at the end of this article. Fill the crop and shape it to continue the line of the breastbone; do not fill it too full, as some allowance must be made for the stuffing swelling during the cooking. The skin should be secured by skewers or stitching or the stuffing will escape and spoil the finished appearance of the bird. Skewers and thread should be removed when the poultry is dished.

Put the bird into a roasting pan, breast side up, with plenty of fat for basting. Have the oven temperature 325 to 350 degrees and allow 20 to 25 minutes for each 1lb. dressed weight of the bird; for example, a 3½lb. chicken needs to be cooked for 1 hour 20 minutes to 1½ hours. For the first hour cook it with the breast side up, then turn it on to the breast for 15 minutes, and finish the cooking with the breast upward again. Slices of bacon may be laid over the breast and legs, and sausages roasted in the pan with the bird.

Gravy: The giblets—that is, the heart, liver, neck, and gizzard—make a good gravy. Prepare them by removing the gall bladder and any discoloured portions from the liver. Cut through the thickest part of the gizzard, remove the gritty contents, and peel off the inner lining. Wash the heart and neck. Peel and slice a small onion and brown it in a tablespoon of melted dripping. Add the prepared giblets, ½ teaspoon of salt, a sprig of thyme, some parsley, a little pepper, and a pint of water or stock. Simmer them gently for 1 hour. Take out the liver, mash it well, and return it to the saucepan to simmer for a few minutes longer. Strain the liquor and use it to make a thick brown gravy in the roasting pan in the usual manner.

Serve roast chicken on a hot dish with the sausages and bacon, the brown gravy, and bread sauce.

Recipes for Older Hens

Old hens may be boiled and served hot with egg sauce or cold with salads. They may also be used for many made-up chicken dishes.

Boiled Fowl with Oatmeal Stuffing

1 old fowl
¼lb. of oatmeal
¼lb. of bread
¼lb. of chopped suet
1 small onion, chopped finely
1 beaten egg
1 teaspoon of chopped parsley
½ teaspoon of mixed herbs
Salt and pepper
Milk

Soak the bread in hot water, squeeze it dry, and beat it with a fork. Add the oatmeal, suet, onion, parsley, herbs, salt, and pepper. Moisten the stuffing with beaten egg and milk.

Stuff the old fowl with the mixture, filling the crop no more than half full, as the stuffing swells considerably. Secure the stuffing well by stitching and skewering. Put the prepared fowl into a saucepan and cover it with cold water. Bring it slowly to the boil and simmer it gently for 3 hours.

[Fraser Niederer photo.

A neatly trussed carcass looks attractive both before and after being cooked.

Meantime make a sauce to pour over the fowl, as follows:—

1 tablespoon of butter
1 tablespoon of flour
2 hard-boiled eggs
½ pint of milk
½ pint of chicken liquor

Melt the butter, stir in the flour, and add the milk and ½ pint of the liquor in which the fowl is boiled. Cook the mixture until it is smooth and thick. Add the chopped-up whites of the eggs. Pour the sauce over the boiled fowl and then sprinkle the sieved yolks over the top.

Chicken Pie

1 old fowl
2 onions, chopped
½lb. of ham or bacon, cut into small squares
A few peppercorns
Sprigs of thyme
3 hard-boiled eggs
Chopped parsley
Salt
Short pastry

Cut the fowl into neat, small pieces and put it into a saucepan with the ham or bacon, the onions, and the peppercorns and thyme tied in a muslin bag. Cover them with cold water, add salt, bring the water to boiling point, and simmer the ingredients gently until the meat is quite tender. Turn the contents of the saucepan into a bowl, remove the seasoning bag, and leave the remainder until it is cold; skim off the fat. Put a layer of fowl into a pie dish, pour in a little of the gravy, and cover it with a layer of hard-boiled egg and chopped parsley; repeat the layers until the dish is filled. Cover it with a short-pastry crust and bake the pie in a hot oven until the pastry is crisp and nicely browned.

Ham-and-chicken Brawn

1 old fowl
1lb. of ham or bacon
Pepper and salt
Thyme, parsley, peppercorns, and 2 cloves tied in a muslin bag

Cut the fowl into joints, put it into a saucepan with just enough water to cover it, and add the bacon, herbs, spices, salt, and pepper. Simmer it gently for 3 hours. Cut the meat into very small pieces. Rinse a large mould or pudding basin with cold water, pack in the meat, and strain enough of the liquor over it to make the jelly between the pieces of meat. If desired, pieces of hard-boiled egg and tomato may be set in the bottom of the mould for decoration.

Turkeys

As with chicken, only young turkeys are suitable for roasting; old birds can be very tough and unappetising if cooked in this manner.

Roast Turkey

Turkeys are roasted in the way described for chickens and stuffed with one of the stuffings given at the end of this article. Slow, gentle roasting gives best results, leaving the meat tender and juicy and the skin browned and crisp without being toughened.

Prepare the turkey, stuff the crop and body cavity, secure the stuffing firmly, and cover the breast with slices of fat bacon. Allow 10 to 15 minutes roasting for each 1lb. of dressed weight. Cook the bird at 300 to 325 degrees, basting it frequently and turning it over two or three times while it is cooking. Half an hour before the roasting is finished remove the bacon from the breast and put sausages in the pan. Make the giblets into stock for the gravy as described for roast chicken.

Serve bread sauce, bacon, and sausages with roast turkey.

POULTRY RECIPES

[*Sparrow Industrial Pictures Ltd. photo.*

Roast poultry ready to be carved. The bird was gutted through the cut from side to side of the abdomen.

Older Turkeys

An old turkey can be boiled for 1½ to 2 hours, then served covered with white sauce made from the liquor and sprinkled with chopped parsley or hard-boiled egg yolk.

If preferred, it may be roasted for ½ hour or until lightly browned after being boiled. The bird should be dredged with flour and basted frequently with plenty of hot fat or it will be dry and tasteless. Old turkeys boiled until tender are good for made-up dishes, for which the remains of a roast turkey can also be used.

Turkey Loaf

Take the bones from a boiled turkey or the remains of a roast turkey and mince the meat with a small onion. Season it well with pepper, salt, 1 teaspoon of chopped parsley, and a little grated nutmeg. Moisten the meat with gravy and bind the mixture with beaten egg. Form it into a roll and flour it well. Roll it in a floured cloth and put it into a saucepan containing just enough boiling water to cover it. Add an onion and a carrot to the water and gently simmer the loaf for 1½ hours. Remove the cloth and serve the loaf hot, or leave it until it is cold, glaze it, and serve it with salad.

The glaze for a cold turkey loaf is made by soaking 1 flat teaspoon of gelatine in 1 tablespoon of water, putting it in a saucepan with ½ teaspoon of meat or vegetable extract and another tablespoon of water, and heating until the gelatine is dissolved. Wipe the loaf with a cloth wrung out of hot water and brush the glaze over it.

Ducks

Young mature ducks are for roasting, but old ducks can be made into a delicious dish by braising and simmering them.

Duckling and Green Peas

Roast two ducklings for 1 hour at 325 degrees. Put a tablespoon of butter into a large saucepan, brown it slowly, and add 1 tablespoon of flour. Add 1 cup of water while stirring continually, add salt and pepper, and bring the sauce to the boil. Lay the ducklings in the sauce and add the desired quantity of green peas. Cover the pan and stew the birds gently for 20 minutes.

Roast Duck

Dress the duck, stuff it, dredge flour over it, and put it into a roasting pan with dripping. Cover the breast with a buttered paper and roast the bird at 325 degrees, allowing 20 to 25 minutes per 1lb. Serve the birds with gravy made from the giblets and apple sauce.

Stewed Duck

1 old duck
2 onions, sliced
Sage
Beef gravy or stock
Flour
Dripping

Melt the dripping in a large saucepan and brown the duck and sliced onions. Pour off the fat, cover the bird with thinned beef gravy or stock, and add salt, pepper, and a sprig of sage. Cover the pan and simmer the bird gently for 1 to 1½ hours. Strain off the liquor and thicken it with a little flour. Pour it back into the saucepan and bring it to boiling point. Put the stewed duck on a deep serving dish with freshly cooked green peas round it.

Cooking an Old Duck

Prepare the duck and stuff it as for roasting. Melt some dripping in a saucepan and braise the duck for about ¼ hour, turning it several times. Add a breakfast cup of cold water, cover the bird, and simmer it for 4 hours. Even a duck up to 5 years old is tender and appetising if cooked in this manner.

Goslings and Geese

Geese are cooked in the same ways as described for ducks, allowing 20 to 25 minutes' roasting at 325 degrees for each 1lb. dressed weight. If the goose is old, steam it for 1 hour before roasting. Goslings are not usually stuffed but are roasted with a pat of seasoned butter in the body cavity. Goose gravy can be sharpened with a few drops of vinegar or lemon juice added just before it is poured into the gravy boat.

Stuffings for Roast Chickens and Turkeys

Herb Stuffing

2 cups of breadcrumbs
2oz. of chopped suet
1 rasher of bacon, cut small
1 tablespoon of chopped parsley
Leaves from 2 sprigs of thyme
Salt and pepper
1 teaspoon of grated lemon rind
1 egg, beaten

Mix all the ingredients but the egg together and bind them with the beaten egg, adding a little milk if necessary.

Sausage Meat Stuffing

1 cup of breadcrumbs
1 cup of sausage meat
1 tablespoon of chopped parsley
1 egg
Thyme or mixed herbs to taste
Salt and pepper
Milk or stock if needed

Giblet Stuffing

1 set of giblets
2 minced onions
2 cups of soaked bread
Milk
Salt, pepper, and crushed herbs to taste

Soak stale bread in milk and squeeze it dry before measuring it. Cut the cooked heart, liver, and gizzard into small pieces. Mix all the ingredients together.

Stuffings for Ducks and Geese

Apple Stuffing

2 cups of chopped apples
1 tablespoon of chopped onion
Salt and pepper
1 cup of soft breadcrumbs
2 tablespoons of dripping or butter
Water or stock

Melt the dripping, fry the onion until it is lightly browned, then stir in the apples. Remove the pan from the heat and stir in the breadcrumbs, salt and pepper, and sufficient water or stock to moisten the mixture.

Sage-and-onion Stuffing

6 onions
1½ tablespoons of chopped sage
1½ flat tablespoons of dripping
3 tablespoons of breadcrumbs
Salt and pepper

Chop the onions, put them in a saucepan, cover them with water, and boil them until they are tender. Drain them well and stir in the breadcrumbs, sage, dripping, salt, and pepper.

Growing Cinerarias for Garden and Greenhouse

CINERARIAS comprise a plant group of great importance and popularity in the home flower garden. Their value is not restricted to the borders, for in a greenhouse they attain excellent proportions, giving brilliant displays of colour during winter. Their culture is not difficult, and in this month's article C. K. Ellis, Horticulturist, Department of Agriculture, Dunedin, describes how the gardener can obtain the best results from his small packet of cineraria seeds.

ACCORDING to their growth and flowering characteristics, cinerarias are divided broadly into three groups.

Those known as *C. stellata* produce, as the name suggests, star-like flowers. The *stellata* varieties are the tallest, sometimes growing to as high as 3ft. The stems are slender but fairly strong and the flowers are rather widely spaced in the heads. There is a sub-group of the *stellata* type, known as the cactus group, in which the growth is the same, but the edges of the individual ray florets are rolled back, giving a rather "spiky" appearance.

The second group consists of *C. grandiflora* and its forms. The growth habit of this type is dwarf, with very thick, strong stems. The flowers are large, often as much as 3in. in diameter. Probably the widest colour range is obtained in this group.

Between these two groups is one appropriately named *C. intermedia*, and it is truly intermediate in all respects.

Each of these groups has been divided by breeders into innumerable strains and varieties. The most popular and successful of these are listed in almost any flower seedsman's catalogue. Seed may be sown over several months according to the gardener's own requirements; whether the bulk of the plants are required for the borders or for greenhouse work.

Cinerarias for the Greenhouse

To obtain plants for greenhouse display cineraria seed can be sown at any time from October to February. Sowing a little seed at intervals of a few weeks through this period ensures almost continual displays of brilliant colour from June until November.

A very satisfactory soil mixture for this purpose can be prepared by mixing together 2 parts by bulk of loam, 1 part of leaf mould, and 1 part of sharp sand and adding 1½oz. of superphosphate and ¾oz. of carbonate of lime to each bushel of the mixture. For home garden purposes a bushel can be taken to be the capacity of a standard apple case. Many gardeners prefer a rather more gritty soil; a further half-part of sharp sand can be added to obtain this condition.

Cinerarias grow well in a shaded place and make a brilliant display during spring and early summer.

Boxes, pots, or seed pans can be used for the seed sowing. If boxes are used, a layer of coarse, rotted organic matter should be placed in the bottom of each to assist drainage and prevent the soil from falling through the spaces between the boards. The soil level should be brought to within an inch of the top of the box and tamped down until it is of an even firmness and the surface perfectly level.

Pots and pans require adequate drainage material. One large crock is placed over the drainage hole and a few smaller ones around it. On top of these is set about an inch depth of fairly finely broken crocks, and on top of this a ½in. layer of organic material, such as spent hops or flax fibre, is placed to prevent the soil from falling among the crocks. The seed soil is then placed in the receptacle and progressively firmed as filling proceeds until the level is about an inch below the rim of the pot or pan and the surface perfectly level.

Whatever the receptacle used, the soil content must be thoroughly saturated with water, preferably before the seed is sown for fear of washing it out of the soil by watering afterward. It is better to assume that germination will be good and sow rather thinly and evenly than to assume that germination will be poor and sow thickly, because if germination proves better than expected, the resultant seedlings will have insufficient room for proper development.

After the seeds have been distributed over the soil a light "topping" or covering of soil is placed over them. This soil covering may be distributed through a 1/14in.-meshed sieve, but if one of these is not available, one of ⅛in. mesh will suffice provided care is taken that the covering does not become too thick. Capillary action soon draws the water up around the seeds and through the soil cover, so more watering is not necessary for this purpose.

The receptacles should be put in a moderately warm place for the seeds to germinate. A glass cover should be provided to prevent excessive moisture loss by evaporation, and a sheet of brown paper prevents the entry of excessively bright light. The seeds do not need a long time to germinate, so a daily watch should be kept for the first sign of the seed leaves, or cotyledons, and when what is thought to be a fair proportion of them have appeared above the soil, first the paper and soon afterward the glass should be removed.

The seedlings grow rapidly through the seed-leaf stage and soon produce the first of their true leaves. Therefore the plants should be pricked out as soon as possible after the full development of the seed-leaf stage, or at least not later than when each plant has only two true leaves. Pricking out later than this causes too much root damage, recovery from which is often slow.

The soil mixture used for seed sowing is excellent for pricking out, and the seedlings are pricked out 2in. apart in boxes prepared in the same way as for seed sowing. During this operation, however, the boxes are not watered before the plants are pricked out but afterward, with a fine spray. This moistens the whole plants and assists the roots to settle into the soil.

When the leaves of the plants touch each other in the boxes it is time to pot them up into 3 or 4in. pots. A good potting mixture is one consisting of 7 parts by bulk of loam, 3 parts of peat or leaf mould, and 2 parts of sharp sand, with 1½oz. of dried blood, 1½oz. of superphosphate, ½oz. of muriate of potash, and ¾oz. of carbonate of lime added to each bushel of the mixture. The pots should be well crocked and well filled with soil, for the small plants soon grow through them. The soil level should be no more than ½in. from the rim of the pot. After a couple of days in the greenhouse to allow the plants to recover from the potting they should be placed out in a cold frame where they have a better chance of remaining cool during summer.

As soon as the small pots become filled with roots the plants should be potted on to 6 or 7in. pots according to their vigour. The same soil mixture as for the original potting should be used, and after being potted on the plants should be returned to the cold frame and allowed to remain there until colder weather approaches. At the first sign of frost the plants should be taken into the greenhouse and given adequate space for full development. Some provision should be made for shading them from strong, direct sunlight and the temperature of the greenhouse should be kept as low as possible without its being reduced to less than 40 degrees F. by night. If the plants are required for display at an early date, 50 to 55 degrees is the best temperature range in which to grow them.

All that is required of the gardener from then on is attention to watering and picking the plants over occasionally to remove dead or unhealthy leaves.

Especially when the plants have been grown rapidly, it may be found necessary to feed them as they approach the flowering stage, and weak liquid manure is satisfactory for the purpose. It can be prepared by suspending a bag containing a few pounds of animal manure in a drum of water. This "feed" should be used only when the plants obviously need supplementary food, such as when the roots are growing vigorously through the drainage hole at the bottom of the pot, or when the leaves are yellowing slightly as a result of starvation. Overfeeding does more harm than good. Before the liquid manure is applied it is wise to water the plants thoroughly, as damage is often caused by applying the "feed" to a dry soil.

Cinerarias for the Borders

The early procedure in raising cinerarias for the borders is the same as that in raising them for the greenhouse. The seeds are sown during October, November, or December and pricked out in the same manner. However, when the leaves of the plants touch each other the plants are not potted up. The boxes are placed in a cold frame or some other sheltered spot for a brief period and the plants gradually hardened off until they are able to stand normal atmospheric conditions. At any time after they have reached this stage they may be planted out in the borders, preferably in a moderately frost-free position.

Herbaceous plants such as delphiniums, lupins, and doronicums should have all faded flowers removed now in the early districts. In this way a further display of blooms is often obtained in late autumn.

Enemies of Cinerarias

The most common enemy of cinerarias in New Zealand is the "woolly-bear" caterpillar, the larva of the magpie moth. This pest is a voracious feeder and has a partiality for such weeds as groundsel and ragwort; in fact, it was introduced into the country some years ago with the aim of destroying ragwort. Complete control of such weeds greatly increases the chance of freedom from the depredations of the caterpillar. A sprinkling of derris dust over the plants at intervals keeps the larvae at bay.

Greenflies (aphides) do great injury to cinerarias by puncturing cells of the stems and leaves and sucking the sap. Spraying with nicotine sulphate at the rate of 1 part in 800 of water (½ fl. oz. to 2 gallons of water) gives satisfactory control if repeated at 10-day intervals until all trace of the pest has disappeared. To each 2 gallons of this mixture should be added 1oz. of soft soap or 3 fl. oz. of summer spraying oil.

The leaf-miner maggot also attacks cinerarias. The fly lays its eggs on the leaf and when they hatch the maggots burrow into the leaf and devour the tissue between the upper and lower epidermes. The best means of control are the eradication of weeds such as groundsel and thistles, which it also attacks, and crushing the maggots inside the leaves whenever they or their tracks are noticed. The maggots are about ¼in. long. Dusting leaves with derris tends to prevent the flies from laying their eggs.

Garden Work for December

Annuals from late sowings should be finally thinned. The hoe cannot be put to much good use in flower borders, so most of the weeding must be done by hand. Only the tallest and most vigorous types of annuals should need staking. Only by continual removal of all dead flowers and developing seed pods can a continuous display of flowers from annuals be guaranteed.

Bearded irises have horizontal fleshy stems or rhizomes, which develop along the surface of the soil and soon overcrowd each other. For good displays and healthy plants these irises should be lifted and divided every 2 or 3 years. It is possible to lift and divide them immediately after they have ceased flowering; in fact, under New Zealand conditions, this appears to be the best time for the operation. Bearded irises thrive in a rich, well-drained soil and appreciate an annual dressing of 2oz. of superphosphate and 2oz. of carbonate of lime to each square yard of bed.

Begonias of the tuberous-rooted type growing in pots should be coming into flower and, if necessary, they should be fed with weak liquid manure. Feeding after the main flowering period has been reached tends to induce weak, useless growth. Laterals (unwanted side shoots) can still be removed to be used as cuttings. The small side flowers (females) should be removed, as they are of little value

Borders should be given an overhaul during December. [*Douglas Elliott photo.*

and detract from the beauty of the main or terminal flower.

Borders should be overhauled during December, marguerites, wallflowers, and other spring-flowering plants which have passed their best being either cut back severely or pulled out. The gaps left can be planted up with late-raised bedding plants such as marigolds.

Bulbs which flower in spring, such as daffodils, hyacinths, and tulips, may be lifted as soon as the leaves have turned brown and withered. They should never be lifted before this, because the bulbs depend on the food withdrawn from the leaves for their well-being next season. When the bulbs are lifted the soil should be shaken from them and the foliage left on if it does not fall off readily. They should be placed in a single layer in wooden trays and be put in an airy shed to dry off. If they are stored in heaps, they sweat and deteriorate, and if left outside exposed to the sun, they are also damaged. This applies particularly to tulips, the development of which is greatly hampered by exposure of the bulbs to bright sunlight. Dead foliage and loose scales can be removed as soon as the bulbs are quite dry, but twin or triple bulbs should not be pulled apart at this stage, because injury to the basal plate and entry of fungus may result. Rotten bulbs or ones soft at the neck should be burnt immediately, for they are likely to be infected with the pest known as bulb mite. Bulbous irises will start to die down in December, and these too may be lifted and stored as soon as the foliage has withered. These bulbs will be replanted in early autumn, but bulblets may be removed and sown in drills almost straight away; in 2 to 3 seasons they will produce flowers.

Asters usually grow rather vigorously and become tall. In windy districts staking and tying them is advisable.

Carnations should be layered as soon as the growths are large enough to be handled easily. About 5in. back from the tips the stems should be split up the centre with a sharp knife and pegged down into the soil with a fairly shallow covering over them. In frost-free districts the perpetual-flowering types are greatly preferable to the border varieties, as they flower over a much longer period.

Chrysanthemums should be staked as soon as they have grown tall enough to need support. Delaying this job is foolish, for winds can take heavy toll of the best stems. A stake should be driven in a little behind each stool and the main stem tied to it. A loose loop of raffia right round the plant and stake is of assistance in very windy localities. The stake should be about as tall as the height to which the flower stems are likely to grow.

Dahlias require a lot of water during their growing season. If the soil becomes dry, it should be given a thorough soaking, and a few hours later it should be gone over with a hoe to prevent caking. Staking should be continued; further ties will be necessary on stakes put in during November.

Fuchsias will be growing strongly during December and should be watered thoroughly if necessary. They appreciate a light dressing of equal parts of superphosphate and sulphate of ammonia watered in at the rate of ½oz. per gallon of water per square yard.

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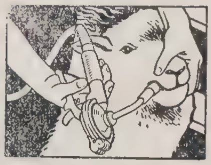

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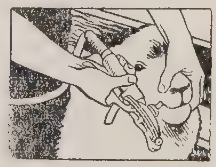

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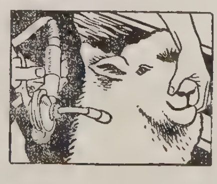

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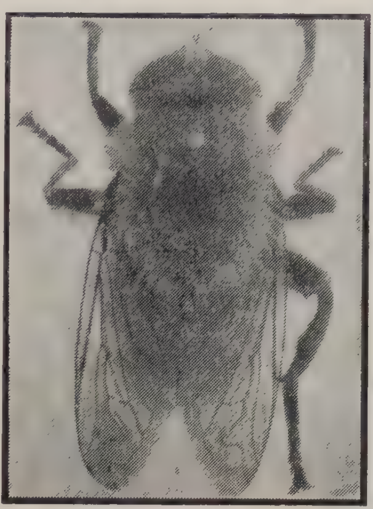
Herbaceous plants such as lupins, delphiniums, and doronicums should now receive attention in the earlier districts. Faded flowers and flower spikes should be cut off and the plants generally tidied up. When flowering has finished, cutting the stems back to the ground and giving a generous mulch of good compost around the plants often produces a further batch of shoots which will flower during late autumn; the second shoots should be thinned out to two or three per plant.

Pinks should be replanted every 2 or 3 years, because old plants produce few flowers and look untidy. Pinks can be propagated from December to February by "pipings", which are pieces 2 to 3in. long pulled from the centres of the new shoots. These should be inserted in sand in a cold frame or in boxes with a sheet of glass over them. A sheet of newspaper should be placed over the frame or box to exclude intense sunlight. In 3 to 4 weeks the pipings will have rooted, and soon afterward they may be planted out to their flowering positions.

Pruning of ornamental brooms should be done as soon as they have finished flowering. Cutting into old wood is likely to be fatal. The best plan is to shorten back to within an inch or two of its base each shoot that has flowered; new shoots will grow from the stub that is left. Early-flowering heaths and deutzias should also be pruned back hard immediately after they have flowered.

Roses of the climbing and rambling types should have their new growths tied in before they are long enough to sway about and become damaged. Roses of all types can be budded as soon as the bark lifts readily on the stocks.

Seed of quite a number of herbaceous perennials which are cheaply and easily raised in the home garden may be sown during December. Among these are Russell lupins, aubrietias, anchusas, thalictrums, heucheras, and *Alyssum saxatile*. The seeds should be sown in boxes or in small open beds and the plants set out in the borders in autumn.



An adult of the large narcissus fly, the larvae of which attack a wide range of flowering bulbs.

Sweet peas will be in full bloom in December, and every few days all spent flowers and developing seed pods should be removed to keep the plants blooming well. Removal of a few of the side shoots during the growing period keeps the plants open and gives adequate room for the development of long flower stalks.

Seasonal Pests

Aphis (greenfly) will again be troublesome during December on a very wide range of host plants. Nicotine sulphate sprays should be used at regular intervals to control it.

Chrysanthemum eelworm attack will now be showing its effect on the lower leaves of the plants. These particoloured, shrivelled, or dead leaves should be removed and burnt. Regular spraying with nicotine sulphate assists in preventing further migration of the eelworms.

Narcissus flies of the large type are a common and important pest of many flowering bulbs. They are stout, hairy insects, usually marked with red or orange bands. They lay their eggs near the bases of the leaves of bulbous plants toward the end of the bulbs' growing season. When bulbs are near the surface the flies may crawl down and lay their eggs directly on the bulbs. In either case, after the eggs have hatched, the larvae eat their way into the bulbs, which, even if they are not killed, are prevented from flowering in the following season. Affected bulbs are shrunken and soft and usually have a corky basal plate. The larvae, which are maggots, may be seen if the bulb is broken open or cut through the middle with a knife.

The larvae remain inside the bulb right through the dormant season, and this fact has a great bearing on the distribution of the pest. As the larvae are completely enclosed within the bulb, heat treatment is the only measure which is completely effective against them. It consists of immersing the bulbs for 2 hours in water which is maintained at 110 degrees F. Care should be taken not to exceed that temperature or the bulbs may be killed. This treatment should be given all new stocks of bulbs as a precaution against introducing the pest into a clean garden.

Thorough cultivation of the soil between the bulbs as soon as the foliage begins to die down, and after it has been removed if the bulbs are not lifted, fills all holes left by dying down of leaves and makes reaching the bulbs much more difficult for the flies and larvae.

Ericas for Winter Flowers

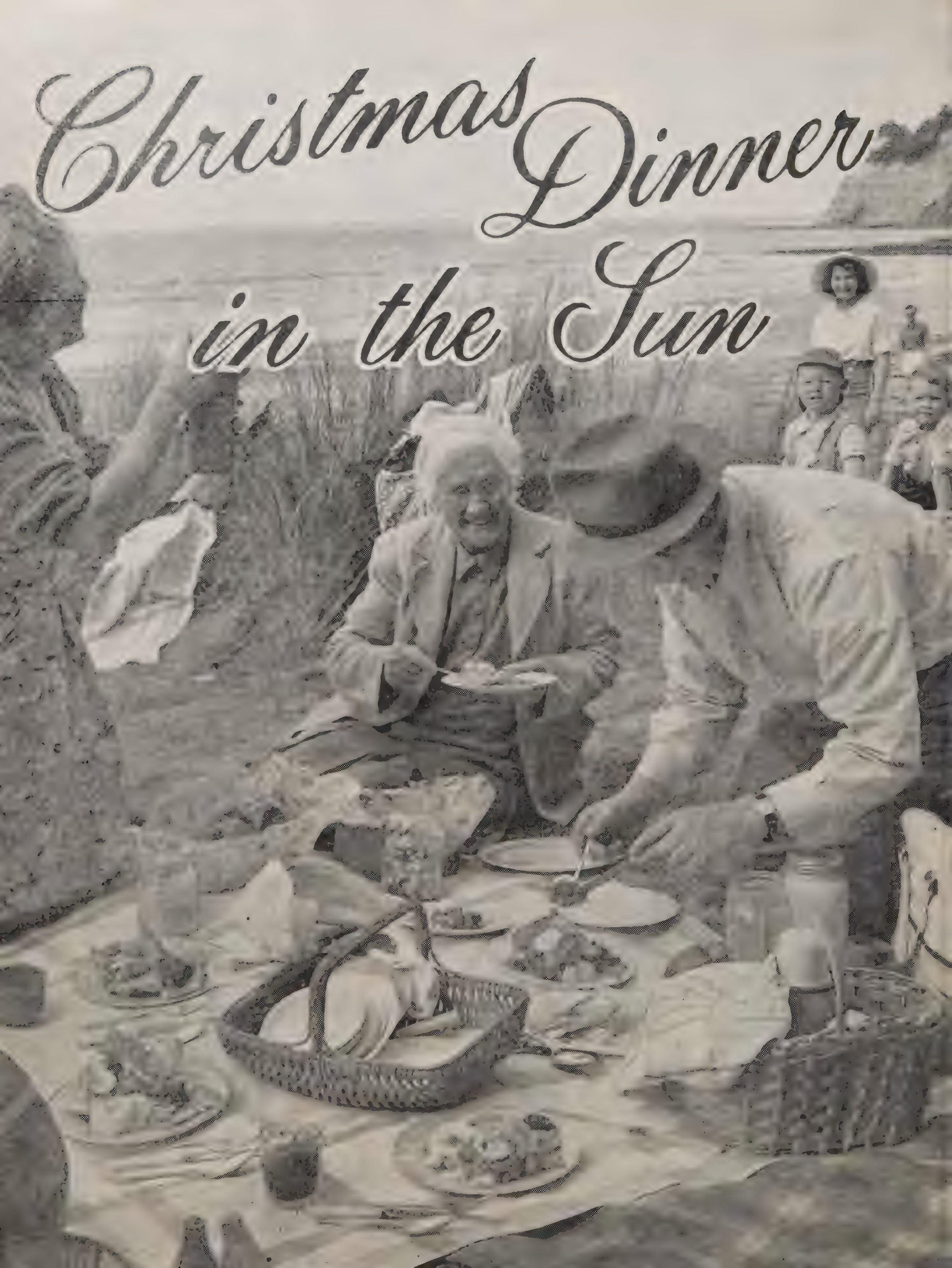
POPULAR shrubs of a very large and important genus consisting of several hundred species and varieties are *Erica melanthera* (left) and *E. pyramidalis* (right). Like most ericas, these species are very free flowering and are worth a place in all plantings of shrubs, as they flower from mid-winter when other blooms are scarce. They grow most freely in a lime-free, peaty soil, rather light and well drained—similar to that which suits rhododendrons, azaleas, and kalmias.

These species appear to grow well without any special care and make a brilliant show when covered with bloom. If pruning is necessary to keep them bushy, it should be done immediately after the plants have flowered.

Selected varieties must be reproduced by cuttings, which must be firm, young side shoots ½ to 1in. long, preferably taken with a heel during January, February, or March, and inserted in a close frame in a cool greenhouse. They are then transplanted to prepared beds the following spring. The potting medium recommended for raising cuttings is clean, coarse sand, plus peat that has previously grown heather if available, and this should be well watered and rammed firm.

—H. P. THOMAS, Vegetable Instructor,
Department of Agriculture, Wanganui.

Christmas Dinner in the Sun



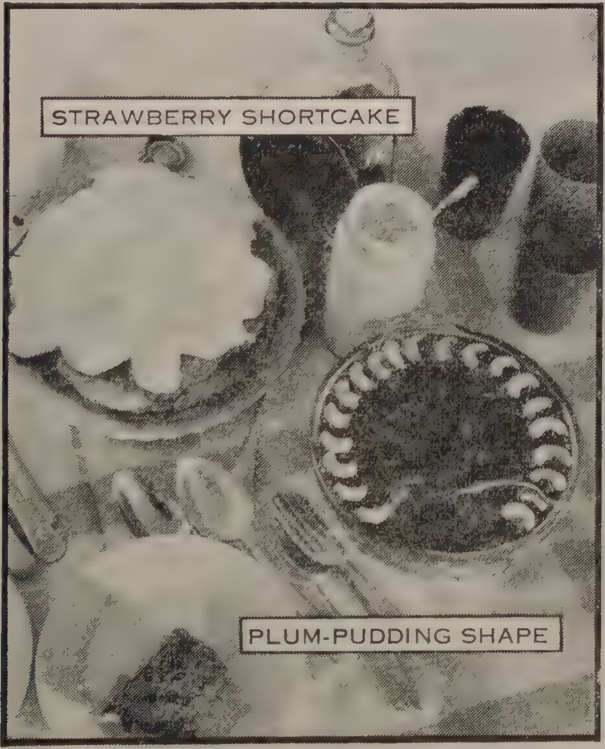
PICNIC FARE FOR OUTDOORS OR INDOORS

IF the weather is kind, a Christmas picnic party is a memorable occasion for members of the family of all ages. On the other hand, should a sudden rainy spell start on Christmas Day, plans must be abandoned and the family is faced with what appear to be never-ending piles of sandwiches, small cakes, and other typically picnic fare which never tastes so good when eaten at home. In this article Eva Topping, Rural Sociologist, Department of Agriculture, Auckland, suggests a menu which, though easy to pack and carry, could be served equally well on the dining table if the weather proved unsuitable for an outdoor meal.

COMBINING forces with a neighbouring family for a Christmas picnic enables more people to enjoy the fun, and the food preparation can be simplified by dividing the work between the two kitchens. One family might be responsible for the meat course and the other for the sweets, as making a large amount of one kind of food is much less bother than making smaller quantities of several varieties.

Packing Equipment

Greaseproof and waxed paper are needed for packing. Waxed paper printed in Christmas designs gives a decorative appearance to the picnic spread if used for lining tins and wrapping damp foodstuffs such as lettuce and tomatoes. Plenty of paper serviettes with an appropriate design are both decorative and useful. Plastic cups and beakers are almost a necessity, and a pair of salt and pepper shakers should not be overlooked; teaspoons in the same ware are a useful addition to the picnic outfit. Jars in several sizes with screw-on lids and plenty of tins are needed for packing the items for the meal, and, of course, spoons, forks, knives, and plates must be included.



[*Photographs on this and opposite pages by Sparrow Industrial Pictures Ltd.*

Menu

* * *

Cold roast lamb

Jellied Christmas salad
New-potato salad
Lettuce
Mint-sauce jelly
Salad dressing

* * *

Strawberry shortcake
Plum-pudding shape
Whipped cream
Nuts and raisins

* * *

Milk
Summer-day quencher
Tea

* * *

Ham-and-cheese rolls
Coffee-chocolate cake

If one basket or case is packed with all the cutlery and crockery needed, the paper napkins, table cloth, and salt and pepper shakers, and the contents are covered with a clean tea towel, everything for "setting the table" will be together and the towel will keep out dust or sand. The tea towel is also sure to be useful for wiping plates or fingers when the meal is being served.

Preparing the Meat

The meat chosen for a New Zealand Christmas dinner is usually lamb or poultry. Whichever is preferred, it can be cooked on Christmas Eve and put away to cool. The next day poultry can be cut into convenient portions, or the lamb carved, and packed in greaseproof paper in a tin.

If poultry is chosen, cold baked sausages and sliced ham are the perfect accompaniments, and they should be wrapped separately and packed into the tin. Poultry stuffing should be cut into slices and also wrapped separately, but put into the tin with the meat to simplify serving.

Lamb calls for mint sauce, but as it is difficult to carry, gelatine is added and the liquid poured into a jelly jar to set. Covered with a circle of waxed paper and the metal lid, the mint sauce becomes easily transportable.

Recipes

Recipes are given for making the dishes in the menu for the picnic meal above and in the pictures on this and the following pages; the quantities are sufficient for 9 or 10 servings.

POTATO SALAD
MINT JELLY
JELLIED SALAD

Jellied Christmas Salad

- Fresh cooked green peas
- 1 spring onion
- ¾ pint of liquid (water, clear stock, or diluted tomato juice)
- 2 dessertspoons of gelatine
- 3 hard-boiled eggs
- Tomatoes
- Mint
- Salt and pepper

Soak the gelatine in ¼ pint of cold water; heat the ¾ pint of other liquid to boiling point and pour it over the gelatine, stirring until it is dissolved. Stock made from chicken giblets or mutton bones and flavoured with carrot and parsley is a very suitable liquid. Season the jelly with salt and pepper and leave it to cool a little.

Slice the eggs and tomatoes, dip the slices in the cooled jelly, and arrange them on the sides and bottom of a quart basin or mould which has been well rinsed in cold water. Arrange the bottom slices first, then carefully put in a layer of cooked peas and pour in a little jelly very gently. Arrange more slices of egg and tomato on the sides, and fill the mould with alternate layers of peas and sliced tomato. Pour the rest of the jelly in gently so as not to disturb the decorative arrangement of the egg and tomato. Set the salad aside in a cool place until next day.

Leave the salad in the vessel when it is taken to the picnic. Cover the top with a circle of waxed paper and a cap of greaseproof paper to keep out dust. The salad may be unmoulded on to a plate just before the meal or served from the basin; if the latter method is favoured, choose a glass basin or mould in which to set the salad. Take plenty of ready-prepared lettuce, wrapped in waxed paper, and some sprigs of parsley for garnishing the salad.

Mint-sauce Jelly

- 1 dessertspoon of sugar (more if a sweet sauce is preferred)
- 3 tablespoons of chopped mint
- 1 teaspoon of gelatine
- Vinegar

COFFEE-CHOCOLATE CAKE
HAM-CHEESE ROLLS

Chop enough mint to yield 3 tablespoonfuls. Soak the gelatine in 2 tablespoons of cold water, add 2 tablespoons of boiling water and the sugar, and stir until they are dissolved. Add the mint and sufficient vinegar to make the sauce up to ½ pint, pour it into a jelly jar which has been rinsed out with cold water, and put it in a cool place overnight to set. Lay a circle of waxed paper on top of the jelly and cover it with the metal lid of the jar before packing it.

New-potato Salad

Cook a sufficient quantity of new potatoes in fast-boiling, salted water to which a large sprig of mint has been added. When the potatoes are cold slice or cube them fairly thickly so that they do not break up when carried. Chop a generous amount of parsley and sprinkle it thickly over the cut potatoes. Add salad dressing and, using two forks, move the potato pieces until they are well coated with dressing and parsley. Put the potatoes into preserving jars and screw on the lids before packing for the picnic.

Salad Dressing

2 flat tablespoons of sugar
1 flat teaspoon of mustard
1 flat teaspoon of salt
1 flat tablespoon of flour
½ cup of vinegar
2 eggs
¾ cup of milk
1 tablespoon of butter

Mix the sugar, mustard, salt, and flour together thoroughly in a small basin, then add the vinegar gradually to make a smooth paste. Beat the eggs well and add them to the mixture. Add the milk gradually, stirring constantly. Place the basin in a saucepan of hot water to cook the dressing. Add the piece of butter when the mixture begins to heat and stir continually until the dressing is thick and smooth. Cool it and use half for the potato salad; pour the remainder into a glass jar (which has a lid), as it will be needed for serving with the salad shape. This salad dressing may be diluted with a little milk before being used, but it is better stored at full strength.

Plum-pudding Shape

Though plum pudding is a traditional part of Christmas fare, it is not very suitable for a hot day or for a picnic, but a plum-pudding shape is fruity and makes a delicious alternative.

3 dessertspoons of gelatine
3 cups of milk
3 tablespoons of cocoa
¾lb. of nuts (walnuts, cashew nuts, almonds, or a mixture of all three)
½ teaspoon of vanilla
½lb. of chopped peel
½ cup of sugar
2 cups of prepared fruit (a mixture of currants, raisins, sultanas, figs, and dates)
Pinch of salt

Mix the cocoa with a little cold milk; bring the rest of the milk to boiling point, add the cocoa mixture, the fruit, sugar, and salt, and boil them for 15 minutes. Soak the gelatine in 2 tablespoons of cold water and add ½ cup of boiling water less 2 tablespoons; that is, use only ½ cup of water in all. Add the dissolved gelatine to the fruit mixture and stir thoroughly. Reserve some of the nuts for decoration; chop the remainder, add them, with the vanilla, to the mixture, and stir it again. Rinse a basin or mould with cold water, pour in the mixture, and decorate it with nuts.

The pudding will carry well in its basin and need not be turned out, so the top can be decorated. However, if it is to be unmoulded, dip the nuts into the gelatine mixture, arrange them on the bottom of the basin, and pour a little liquid pudding round them very carefully so that they are not displaced. Let the small amount of mixture set, then gently pour in the rest of the pudding. Threepenny pieces or silver lucky charms can be stirred into the mixture, making it even more like a real Christmas plum pudding.

Cream can be whipped, sweetened, flavoured with rum, vanilla, or almond essence, and served with the shape. It carries quite well in a preserving jar wrapped in a damp tea towel to keep the cream fresh and cool.

Strawberry Shortcake

Strawberries are usually well in season at Christmas time, so a strawberry shortcake can be a second sweet for the party. Take the two halves of the shortcake in a tin, one jar of mashed strawberries, and another of whipped cream. Assembling the sweet just before it is needed is a matter of moments, and it looks better than if it were completed before being packed.

2 cups of flour
3 flat teaspoons of baking powder
1 tablespoon of sugar
Pinch of salt
4 tablespoons of butter
1 egg
½ cup of milk

Sift the flour, baking powder, sugar, and salt, rub in the butter, and mix them to a soft dough with the beaten egg and milk. Turn the dough out on a floured board, divide it into two portions, and pat them into two round, flat cakes. Put the cakes into two 8in. sandwich tins, previously greased and floured, and bake them for 20 minutes in a hot oven (425 degrees). Stand them on a wire tray to cool, covered with a cloth. Crush ripe strawberries, sweeten them to taste, and put the fruit between and on top of the two layers. Cover the top with sweetened whipped cream and garnish it with whole strawberries. The garnishing can be omitted to simplify the packing of the berries if the sweet is to be served outdoors.

Drinks

Mince pies, nuts, raisins, and fruit are all easy to pack and carry and add the true Christmas touch to a meal. Tea for older members of the party can be either made on the spot or carried in vacuum flasks. Milk in quantity will be needed for the children to drink and for the tea. Fruit-syrup drinks are especially welcome on a hot day and can be taken in concentrated form if fresh water is obtainable at the picnic place. If something different is desired, try this recipe for a mixed fruit drink:—

Summer-day Quencher

1 tin of pineapple juice
1 tin of orange juice
1 cup of lemon juice
Rind of 1 lemon
2 sprigs of mint
1 cup of sugar
4 bottles of ginger ale

Pare the rind of a lemon very thinly, put it in 2 pints of water with the mint and sugar, and boil them for 5 minutes. Cool the liquid, strain it, add the fruit juices, and pour it into a large bottle. Use half fruit juice and half ginger ale in each glass when serving the drink.

[Photographs on this and opposite pages by Sparrow Industrial Pictures Ltd.

CHRISTMAS PICNIC RECIPES . . .

Something for afternoon tea before leaving for home will be needed, and all the items for this meal are better packed in one or two separate containers so that they can be kept in reserve. Something savoury and something sweet will fill the bill, and here are recipes for both kinds of food:—

Ham-cheese Rolls

Cut small strips of cheese and roll a piece of cooked ham round each. Wrap very thin slices of processed cheese round the ham and place the rolls on a dish with the cut ends down; if they are left undisturbed for a while, they will keep their shape. Serve the rolls with water crackers.

Sausage rolls and ham patties are appetising. They can be made the previous day and save the time which would be spent making sandwiches before leaving for the outing.

Coffee-chocolate Cake

½ cup of butter
1¼ cups of sugar
2 eggs
About 1 teacup of milk
1 tablespoon of cocoa
2½ cups of flour
Pinch of salt
4 flat teaspoons of baking powder
1 flat teaspoon of grated nutmeg
1 flat teaspoon of ground cinnamon

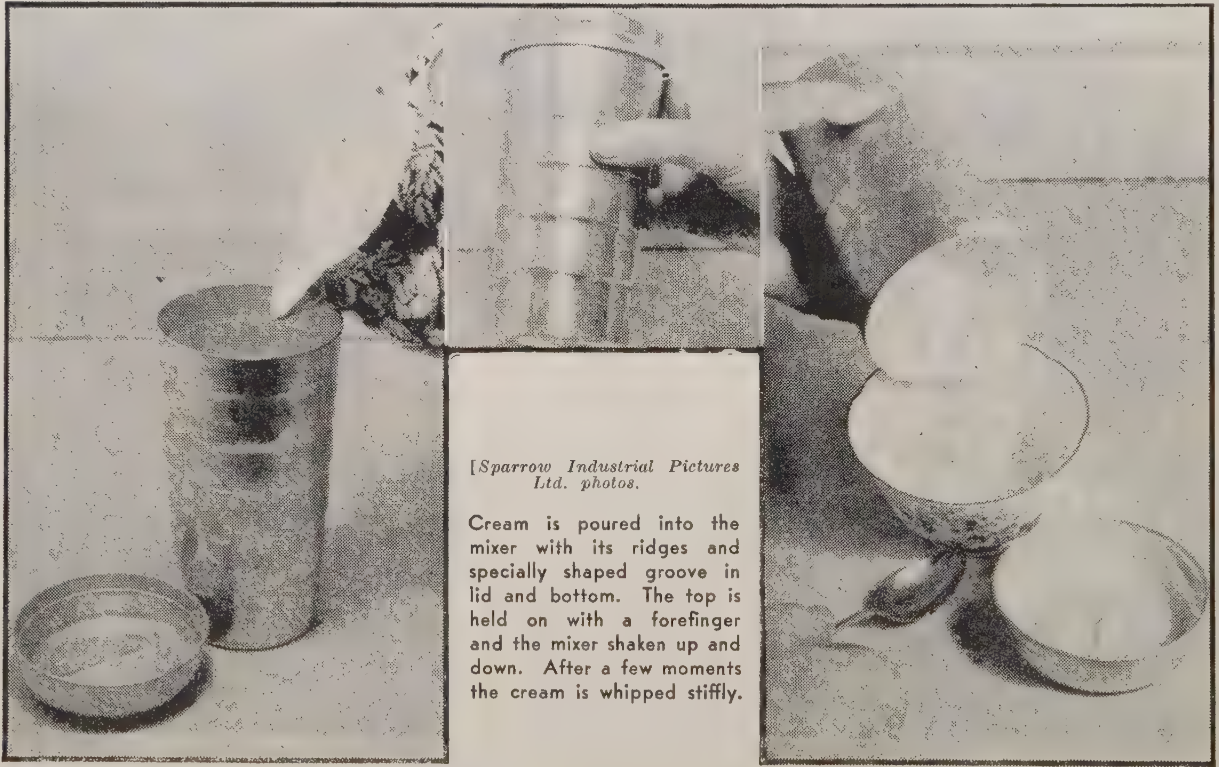
Cream the butter, add the sugar gradually, then beat in the eggs. Sift the flour, salt, baking powder, and spices together and add them gradually to the butter mixture alternately with the milk, beating all the time. The mixture should drop easily without being too moist, so use only sufficient milk to obtain the right consistency. Divide two-thirds of the mixture between two 8in. sandwich tins which have been greased and floured. Mix the cocoa to a smooth paste with 1½ tablespoons of cold water and add it to the remaining third of the cake batter. Bake the three layers in a moderate oven (375 degrees) for 15 to 20 minutes, cool them, and put them together with coffee - chocolate icing, made as follows:—

3 flat tablespoons of butter
3 cups of icing sugar
5 flat tablespoons of cocoa
5 tablespoons of strong coffee
1 teaspoon of vanilla

Cream the butter and add the cocoa and sugar gradually, beating them well until the icing is fluffy. Add the coffee and vanilla a little at a time while continuing to beat. Spread the icing between the layers with a broad-bladed knife or spatula, putting the dark layer in the centre. Spread icing over the top and sides of the cake, leaving broad knife marks for a decorative appearance.

Pack the cake in a round tin. Take a paper doily and use the lid of the tin as a plate when the cake is to be cut.

A Kitchen Mixer which Saves Minutes



[*Sparrow Industrial Pictures Ltd. photos.*

Cream is poured into the mixer with its ridges and specially shaped groove in lid and bottom. The top is held on with a forefinger and the mixer shaken up and down. After a few moments the cream is whipped stiffly.

A QUICK mixer is a helpful addition to the stock of kitchen gadgets. It is useful for mixing thickenings of flour and cornflour with milk, water, or stock. It beats one or two eggs with little trouble and is much easier to wash up than an egg beater.

One type available in New Zealand is shaped like a tumbler and has a series of ridges round it. At the base is a groove shaped to act as a propeller, and the tightly fitting lid has another groove which, running in the opposite direction to the base groove, acts as a repeller. When the mixer is shaken these grooves and ridges agitate the liquid and the beating is speedily effected.

The mixer is a favourite with children, for their mothers can make frothy milk shakes with it. The housewife likes it, as thickenings for sauces, gravies, soups, and custards are mixed to a smooth consistency quickly and easily. The mixer illustrated has another use—as a measurer, because it is marked on the outside in small quantities up to ¾ pint.

—EVA TOPPING, Rural Sociologist,
Department of Agriculture, Auckland.

A Fascinating Account of Early Colonial Days: "Station Life in New Zealand"

ONE of the most fascinating accounts of early colonial life, Lady Barker's "Station Life in New Zealand" has just been reprinted by Whitcombe and Tombs Ltd. It is the story of a woman's activities and observations while living on a Canterbury sheep run in the 1860's. Early exploration had opened up the middle west, past the plains and the foothills, and the roving pioneers were beginning to settle down permanently, building homes and bringing their wives from Britain to share their isolation. Lady Barker married in England and came to Canterbury as a bride, and her letters home were collected to form "Station Life in New Zealand". A resume of the book is given here by Helen Paine, Rural Sociologist, Department of Agriculture, Wellington, for interest in Lady Barker's story has recently been revived. "Station Life in New Zealand" has great value as a record of the social and historical background of the Canterbury settlers, and as such is very readable.

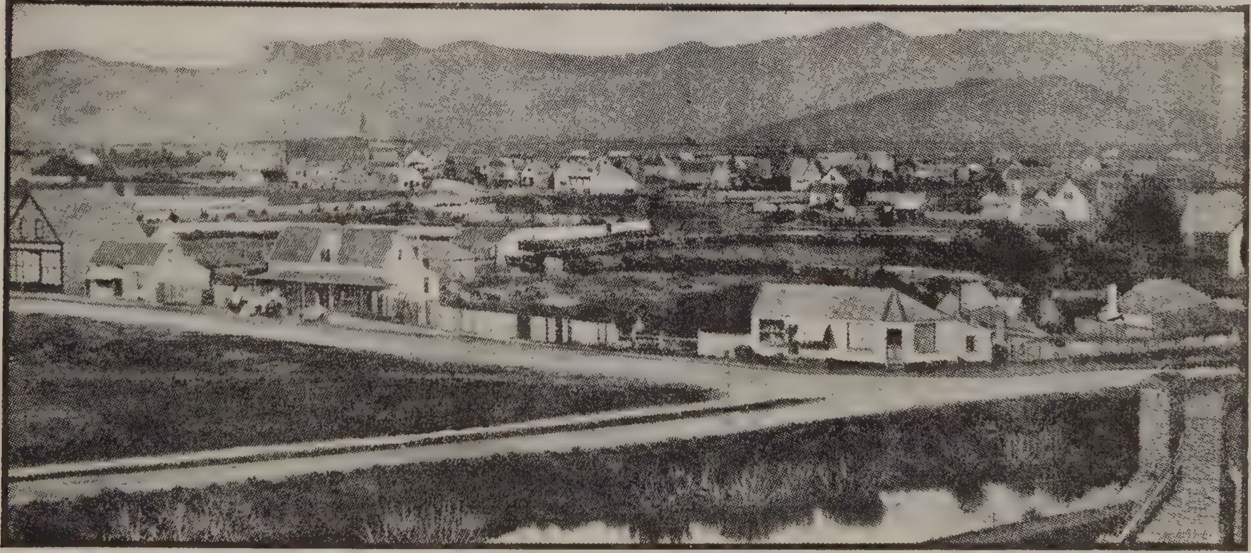
[Photograph by H. P. Hill, reproduced in the "Weekly Press", Christchurch, March, 1911.
Lady Barker.

A HAZARDOUS journey from England was the common experience of most of New Zealand's pioneers. Lady Barker emphasised the worst aspects of such a voyage in the opening chapters of her book: ". . . and oh, the monotony of that time!—the monotony of it! Our decks were so crowded that we divided our walking hours, in order that each set of passengers might have space to move about." The people kept up their spirits with concerts and plays, and it seems to have been these amusements they remembered long after the miseries of the storms and crowds had been forgotten. Nevertheless, the moment they landed was one for which all the travellers were grateful when they realised that their weary days and nights at sea were over.

Most ships stopped for a short time in Melbourne, and here Lady Barker marvelled at the rapidity of growth in the new town, but she scarcely had time to look around before she embarked again for New Zealand. The most dangerous and difficult passage in the whole voyage was across the Tasman in a small mail steamer; they landed at Nelson and Wellington before coming to the end of their journey and disembarking in Lyttelton. Almost as soon as they landed the passengers set out on the last lap of their journey and crossed the hills to Sumner and on to Christchurch. Lady Barker could find no complaint of "any coldness or want of welcome to my new home", and as soon as she had rested she determined to enter into the social life of the thriving town. "Christchurch is a great deal more lively and bustling than most English country towns, and I am much struck by the healthy appearance of the people. There are no paupers to be seen; everyone seems well fed and well clothed; the childen are really splendid."

First View of Station Life

Station life began at once for Lady Barker—not at her own home, but at Heathstock, 65 miles north of Christchurch, where she and her husband enjoyed a holiday for their first few weeks in New Zealand. While staying at Heathstock she was warned not to expect to find its comforts the rule, in case they gave her "a very erroneous impression of station life". In the letters of this period she describes the delight in things around her—a delight which seems to have been intensified



[From the 1900 jubilee number of the "Weekly Press", Christchurch.
The Christchurch of the 1860's which Lady Barker described as "a very pretty little town, still primitive enough to be picturesque, and yet very thriving: capital shops, where everything may be bought; churches, public buildings, a very handsome club-house, etc." Oxford Terrace and Gloucester Street are in the foreground and the Triangle to the left.

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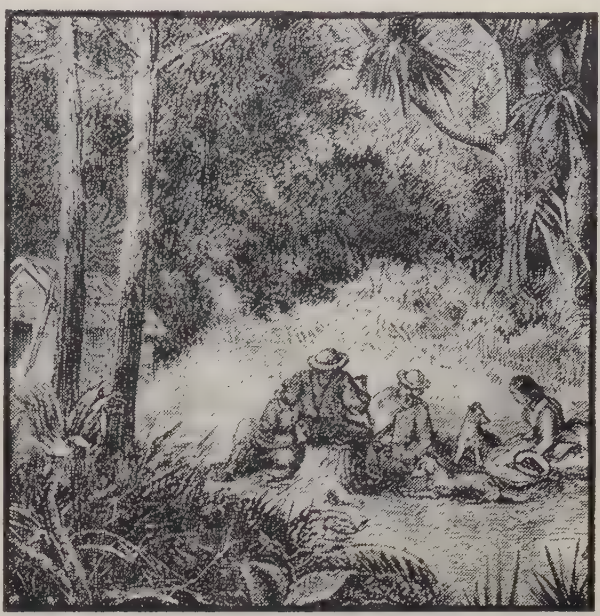
by the long months at sea. Everything was new to her, from the domestic duties of the lady of the house, whom she assisted, to the flower gardening and energetic picnics in the bush. She watched farm procedures with the keen eye of a learner and at Heathstock observed the organisation of one of the finest woolsheds in the country. "I was much impressed by the silence in the shed; not a sound was to be heard except the click of the shears, and the wool-sorter's decision as he flings the fleece behind him. . . . All the noise is *outside*; there the hubbub, and dust, and apparent confusion are great."

After resting, Lady Barker and her husband returned to Christchurch to supervise the construction of their house, the parts of which were being built there for assembly on the station. In Christchurch she had her eyes opened to the servant problem, for in a young country where wages are high and opportunities are plenty most people prefer to work independently, and women were at a premium in the Canterbury of the 1860's, so that any "nice tidy young woman is snapped up as a wife". Many of the settlers hoped to live in New Zealand just as they had in England and were very disappointed if help was not forthcoming in their homes and on their farms. Lady Barker was lucky enough to begin her station life with two servants, and though periodic exchanges took place during her 3-year stay, she was only once left entirely without assistance.

It was in one of her letters during this period in Christchurch that Lady Barker made some general comments about the sort of people she found there. Each family in New Zealand, she thought, was most concerned in providing its own daily wants and cares, though they had plenty of leisure for doing a kind turn for a neighbour. In this routine she observed that people lost the sense of larger and wider interest; "they have little time to keep pace with the general questions of the day". It was a determination to prevent this narrowing of interest that guided Lady Barker's life when eventually she moved from the town to her isolated home in the Malvern Hills.



[From the 1875 edition of Lady Barker's "Station Amusements in New Zealand", published by William Hunt and Company, London.

A picnic in the bush of Canterbury in the 1860's.

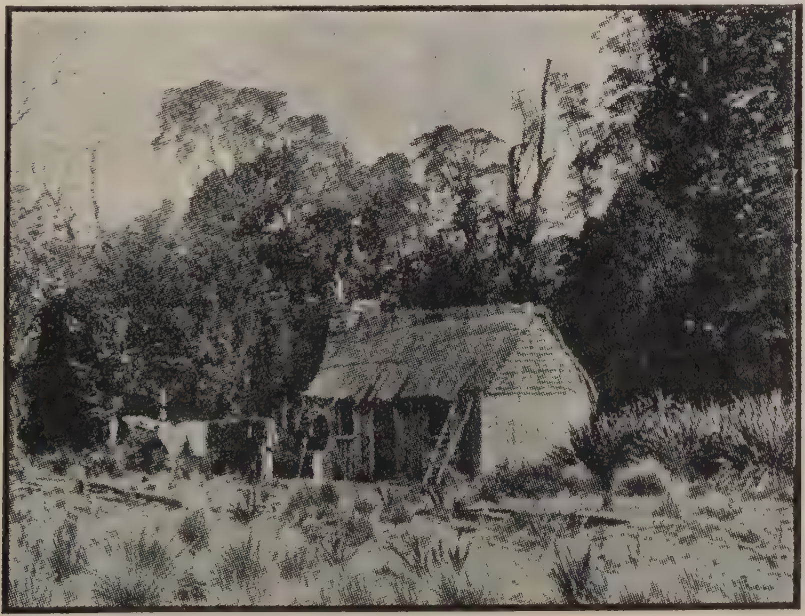
The Daily Routine

The house was nearly finished when the occupants moved in, so they suffered none of the hardships of those who had to build their homes themselves; in fact, everything in the house was described as pretty and comfortable a few months after they had settled in. They had planted trees outside "to obtain shelter from our enemy 'the nor'-wester'," but until these had grown it was not possible to cultivate a garden.

Lady Barker wrote home at this time of her daily duties. To feed the fowls and ducks and pigeons and receive "a morning greeting from all the livestock about the place" was her first task. Then prayers were followed by breakfast at nine, after which she issued the day's orders and instructions in the kitchen; "but generally I find that practice is much better than precept, and I see to the soup myself, and make the pudding—the joint can take care of itself". When the "little fussings about the house" were finished she began what she regarded as her real work, for both she and her husband spent much of their time writing and reading, and this occupied them for the rest of the morning. After dinner the fowls had to be fed again and then the afternoon was free for walking or riding. They would gallop as far as 12 or 15 miles to have a cup of tea with a neighbour and then come slowly home in the twilight.

Lady Barker had lived in India where her first husband was stationed, and after that enervating climate she found Canterbury invigorating and the air on winter evenings particularly fresh and crisp. Though her day's work does not sound like the hard labour of some women who lived in the backblocks, she enjoyed being energetic and knowing for the first time in her life "the satisfaction of feeling that I am of some little use to my fellow-creatures".

Her first experiences of practical cookery cost her some anxious moments, "for", she says, "a cookery-book is after all but a broken reed to lean on in a real emergency"; but washing soda in the soup and a tough omelet seem to have been the extent of the damage.

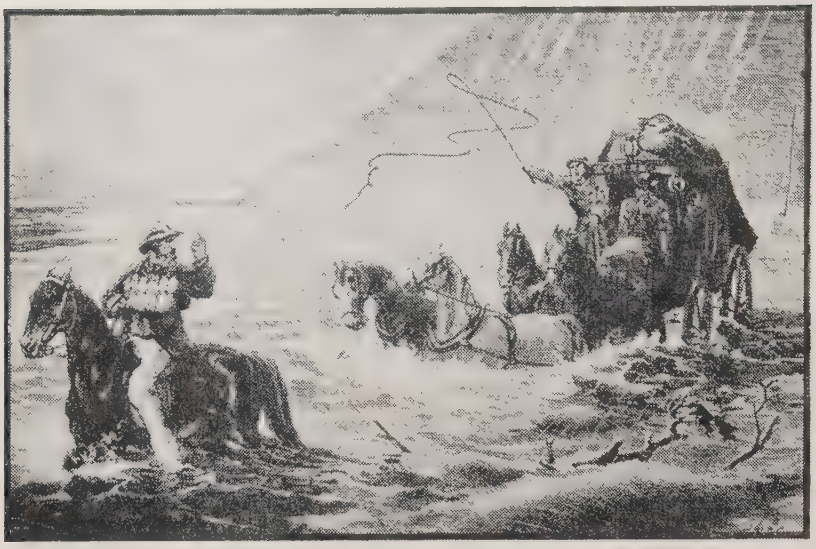


[From the 1900 jubilee number of the "Weekly Press", Christchurch.

A typical out-station on a Canterbury sheep run of the 1860's.

Extraordinary Adventures

Having described her home and her daily routine, Lady Barker's letters became an account of one extraordinary adventure after another. Those afternoon rides often had an unexpected ending, and sometimes she and her husband would set out with a party of friends to hunt pigs in the back country or organise a skating or a sailing party, according to the whim and the weather. The climate of Canterbury played many tricks with



[From the Alexander Turnbull Library photographic collection.

A Cobb and Company coach fording a river. "These conveyances," wrote Lady Barker, "have a world-wide celebrity as Cobb's coaches, both in America and Australia, where they are invariably the pioneers of all wheeled vehicles, being better adapted to travel on a bad road, or no road at all, than any other four-wheeled 'trap'. They are both strong and light, with leathern springs and a powerful brake; but I cannot conscientiously say they are at all handsome carriages; indeed I think them extremely ugly and not very comfortable, except on the box-seat next the driver." Their motive power she described as "four good strong horses, bearing less harness about them than any quadrupeds I ever saw; a small collar, slender traces, and very thin reins comprised all their accoutrements."

these expeditions, until Lady Barker became accustomed to arriving at a hospitable house and being shown into the kitchen because her streaming habit was unfit for the drawing room. Many of the adventures were dangerous, but she preferred to accompany her husband on them rather than remain alone conscious of her isolation. "I can get on very well all day, with my various employments—feeding the chickens, taking the big dogs out for a walk, and so on: but after the house is quiet and silent for the night, and the servants have gone to bed, a horrible lonely eerie feeling comes over me; the solitude is so dreary, and the silence so intense, only broken occasionally by the wild, melancholy cry of the weka."

Loneliness caused some anxiety, but a greater dread was the fear of a north-west storm. They regarded this wind as almost a personal enemy. "It is hardly possible to give you a correct idea of the force and fury of the wind. Not a glimpse of the mountains was to be seen; a haze of dust, as thick as any fog, shut everything out. The sheep had all taken refuge under the high banks of the creeks. . . . The trees bent almost flat before the hot breath of this hurricane."

The Great Snowstorm

One of the most exciting letters Lady Barker ever sent home was that containing the news of the great snowstorm in 1867. For her family it was a period of extreme privation, for their stores were at a low ebb and about to be replenished when the snow began to fall. The first night's fall covered the sheep and the cows, the fowl house, and the pig sties; every scrap of wood disappeared and only the back door was accessible. Breakfast the first day consisted of weak tea and a little mutton; later coloured water was all they could extract from the teapot, though they used up every scrap of tea dust. Dinner the next day finished up the last tin of sardines, the last pot of apricot jam, and a tin of biscuits. "There were six people to be fed every day, and nothing to feed them with." The next breakfast was "a discovered crust of dry bread, very stale, and our dinner that day was rice and salt—the last of the rice in the storeroom." The snow still fell.

The same state of things continued: "a little flour had been discovered in a discarded flour-bag, and we had a sort of girdle-cake and water." They were all "more than half starved, and quite frozen". The servants retired to bed, feeling that they might as well die warm, and the rest of them sat about with the same thought uppermost in their minds: " 'Where are the sheep?' Not a sign or a sound could be heard."

After four days the position was alleviated by a deluge of rain, and they were able to find the fowl house, kill a few fowls, and make some attempt at a hot stew that tasted more like soup. Then at last the wind changed to the north-west and that enemy became a friend, as all immediate apprehension of starvation was removed.

"We forgot all our personal sufferings in anxiety about the surviving sheep." They worked furiously to save what stock remained alive, but they could expect no help from their neighbours, who were all in the same plight. Then it was discovered that on many of the back-country stations "the tragedy of the creeks was enacted on a still larger scale". The sheep had sheltered under the high river-banks and had been snowed in; then, as the snows melted, the rivers flooded and burst their banks, drowning the helpless, frozen animals. "Not only were sheep, but cattle, found dead in hundreds along the fences on the plains. The newspapers gave half a million as a rough estimate of the loss among the flocks in this province alone."

Customs and Traditions

In the face of this disaster and other misfortunes not so great these English settlers expected to keep up the customs and honour the traditions of their country. Sunday was always reserved as a day of worship and rest. The shepherds and neighbours came long distances to Lady Barker's house to join the services which her husband conducted. Christmas too was celebrated with much visiting and being visited. The summer was enjoyed to the full with picnics and long journeys almost every day, and each new trip opened Lady Barker's eyes to the beauty of her surroundings.

After an energetic night's dancing, which had begun at 10 o'clock—"and may be truly said to have been kept up with great spirit until four o'clock: it only ceased then on account of the state of exhaustion of the unfortunate five ladies, who had been nearly killed with incessant dancing"—Lady Barker went for a walk, of which she wrote: "Tired as I was, I shall never forget the beauty and romance of that hour—the delicious crisp *new* feeling of the morning air . . . every moment added to the lovely dawn around me, and I enjoyed to the full the fragrant smells and joyous sounds of another day in this fresh young land."

The extent of travelling at this time is amazing in view of the state of the roads and tracks and the uncomfortable modes of conveyance. These people would spend a week skating at Lake Ida, or ride for miles to Lake Coleridge for a sailing excursion in the summer, and twice during their stay in New Zealand they took long trips—one along the great south road to Waimate and another to the head of Lake Wanaka. Minor accidents often happened on these long journeys, but the unfortunates usually recovered when they reached their destination and the unfailing hospitality of an isolated household.

The stories of a long ride while suffering the agonies of a broken shoulder; of a dangerous pig hunt when her horse was attacked by a wild boar; and of an occasion when the horses broke loose and the riders had to make the 8-mile return journey by foot—these and other tales fill Lady Barker's letters with interest. Her book is worth reading as an adventurous story of pioneer days alone, but "Station Life in New Zealand" has become more than a personal narrative; it is a valuable social and historical record.

CHRISTMAS SWEETS

By EVELYN E. MOORE, Rural Sociologist,
Department of Agriculture, Palmerston North.

FEW of the Christmas preparations do more toward creating the festive spirit than does the making of home-made sweets. The kitchen becomes the centre of activity as the news spreads and the family flocks in, ostensibly to help, but such is the popularity of the products that unless they are guarded carefully they are likely to disappear long before Christmas Day.

HOME-MADE sweets make a delightful and novel gift for a special friend and are more easily packed and carry better than many home-made preserves, cakes, or biscuits which otherwise are acceptable gifts. They also add that final decorative touch without which no child considers a Christmas party complete, and home-made sweets have the advantage of freshness of flavour and appearance which few can resist.

Many cooks, finding that toffees refuse to set, or that fudges become gluey or hard and crumbly, prefer to avoid this Christmas task rather than risk wasting the expensive ingredients often involved. These people may find that the use of a sugar thermometer, which enables them to be certain that their sweets are cooked to the correct stage, ensures success.

However, a knowledge of the intricacies of sugar cookery is not essential to the making of delicious and novel home-made sweets, and people who prefer not to experiment on cooked fondants and creams will find included in this article recipes for uncooked sweets which can be equally attractive. Marzipan sweets are in this category and present endless possibilities for the person who enjoys modelling. Even the less artistically inclined will find marzipan apples, carrots, or oranges easy to make, and they are always attractive additions to a box of sweets prepared as a Christmas gift.

To make the traditional home-made sweets successfully—chocolate fudges, toffee, or coconut ice for example—a person who has no experience in sweet making is well advised to use a sugar thermometer, if only the first time, to find out exactly what is meant by such terms as soft ball, hard ball, soft and hard crack, and caramel. The beginner, at least, is also recommended to avoid using recipes which give cooking times rather than cooking temperatures, for the quality of the confection depends primarily on the cooking temperature reached; that is, rapid boiling in a big saucepan may cause the sweets to be overcooked, and cooking over a low heat may have the reverse effect, just as in the making of jams and jellies in which the same principle is involved. With variations of the type of sugar, amount of liquid, and time of boiling, a sugar mixture can be changed from an apparently simple syrup solution into creamy fondant, chewy caramels, hard, clear, or brown toffee, or intricate spun-sugar creations which delight the eye as well as the palate.

Sweets can be classified briefly into crystalline candies (fondants and fudges), non-crystalline ones (caramels and toffee), and modified candies (marshmallow and turkish delight), which depend on added ingredients such as egg white and gelatine for their special textures.

Making Cooked Sweets

Good equipment, dependable recipes, and accurate measurement are essential for success in making cooked sweets. A good-quality saucepan with clean, smooth sides and base, sufficiently large to allow the syrup to boil up slightly; a brush or fork wrapped in a damp cloth for washing down crystals from the sides of the saucepan; and a sugar thermometer or a bowl of cold water and a cup and spoon for the cold-water tests are necessary.

The method is in most cases basically the same, the main points being:—

Heat the mixture gently, stirring until it boils.

Boil it covered for 2 or 3 minutes to wash down crystals on the sides of the pan, then boil it uncovered, usually without stirring, to the desired stage of hardness. Take thermometer readings or make cold-water tests at frequent intervals.

When the syrup is cooked pour it from the saucepan and do not scrape the pan.

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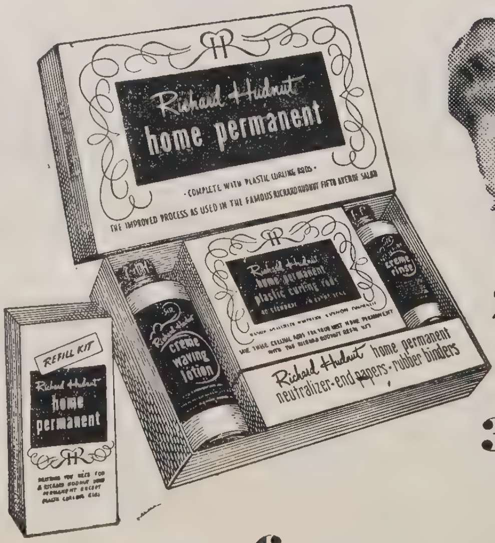
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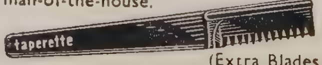

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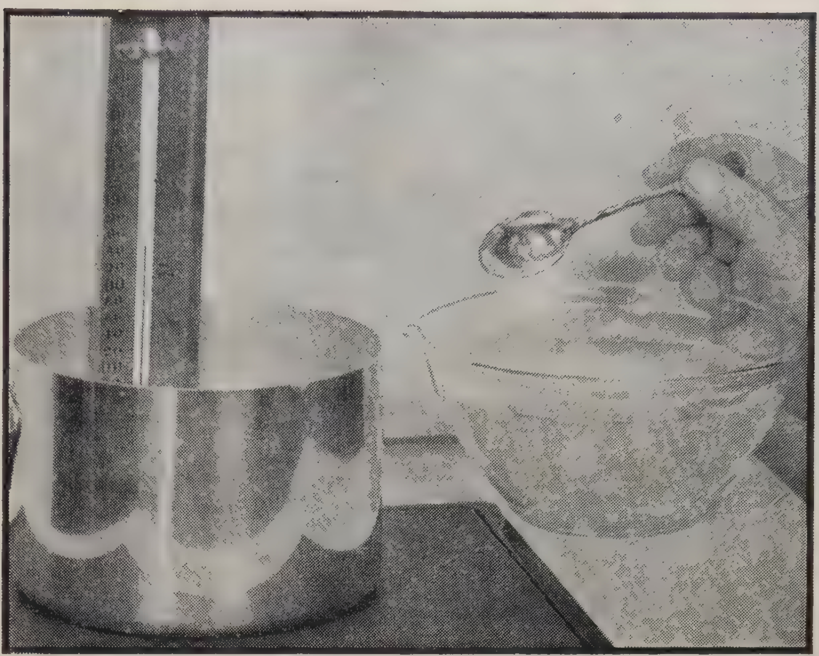

When syrup has reached the soft-ball stage it should just drop off the spoon and form a soft ball in very cold water.

Testing Temperatures

There are five important stages of temperature in sugar cookery, at each of which a different type of sweet is produced.

The first or soft-ball stage is reached at 236 to 240 degrees F., which is the temperature to which fondants, fudges, and coconut ice are cooked. If the proportions are 2lb. of sugar to ½ pint of water, about 10 minutes' boiling is required, but to ensure a satisfactory product the following additional test is really necessary: Take about ¼ teaspoonful out of the boiling syrup and drop it into a cup or bowl of very cold water; when the drop in the water forms a soft ball which can be picked up but which flattens somewhat on being removed from the water the correct temperature has been reached.

The second or firm-ball stage is reached after about 15 minutes' cookery, at a temperature of 244 to 248 degrees. Tested by dropping the syrup into a cup of cold water, a firm ball which can be easily picked up and moulded is formed. This is used for caramels and sweets of a similar consistency.

The third important stage in sweet cookery is the hard ball (250 to 265 degrees), at which the drop of syrup solidifies instantly into a hard lump which is plastic and chewy in texture. It is used for a sweet called nougat, common in America.

The fourth stage, used for toffee and butterscotch, is reached after 20 to 30 minutes' boiling, depending on the amount of butter and liquid present. This soft-crack stage occurs at 270 to 290 degrees, when drops of syrup poured into cold water form hard threads which will bend slightly before breaking. More brittle toffees are produced at a temperature of 300 degrees, when the thread formed in cold water will crack easily and sharply.

The fifth stage, caramelisation, occurs at a temperature higher than 310 degrees, at which the syrup darkens rapidly and crackles and becomes very hard and brittle when dropped into cold water. When this stage is reached great care must be taken not to burn the syrup.

On very damp or humid days the higher temperature at the soft-ball stage produces sweets of the correct consistency.

Fondants, Creams, and Fudges

Apart from ensuring that the syrup is cooked to the correct temperature, perhaps the most important factor in successful fondant or fudge making is beating, especially if velvety-smooth sweets which cut easily and cleanly and do not crumble are desired.

The smooth texture can be further developed by pouring the mixture into a bowl and cooling it somewhat (110 degrees F. is recommended) before beating it, but crystallisation must not be allowed to take place of its own accord or a very coarse-textured fudge will result. To help prevent this keep the sides of the saucepan brushed free from crystals of sugar during cookery, stop stirring the syrup once it has started to boil, and when adding coconut, chopped crystallised fruits, or nuts do not cool the mixture further but beat it at once. If crystallisation does occur, the texture can be improved considerably by immediate beating.

Also of great importance in the cookery of fondants and fudges is the type of sugar used. Glucose forms very fine crystals, so its use favours the production of sweets with a fine, smooth texture. Nearly always present in good recipes for these sweets are glucose or sugars containing glucose, such as honey and corn syrup; acid sugars such as golden syrup; and cream of tartar and other acids which change some of the cane sugar into glucose and another sugar, fructose, which has a similar effect. Butter, condensed milk, or milk also help to produce smooth fudges. However, the amounts of these substances added must be measured accurately, as too much may prevent the fudge or fondant from setting properly.

Also needed are a wooden spoon for beating and stirring, waxed paper for fondant, and a cold surface for kneading fondant, such as a terrazzo, steel, or tile bench top, a large plate, an enamel tray, or a slab of marble.

Cooked Sweet Recipes

Fondant

Dissolve 2lb. of sugar and a pinch of cream of tartar (⅛ teaspoon) in 1½ cups of water (12oz.) over low heat. Boil it covered for about 3 minutes to dissolve crystals that collect on the sides of the pan. Then boil it uncovered and without stirring until a small amount of syrup forms a soft ball when dropped into cold water (238 degrees F.). Wash down the sides of the pan with a brush or damp cloth if necessary. Immediately pour the syrup into a bowl, cool it to 110 degrees (at this temperature the syrup is still hot but the bowl can be held comfortably in the hand), and beat it until it becomes opaque and thick. Turn it on to a cold surface and knead it until it is smooth. The fondant is then ready to be used for fillings for date or walnut creams or for peppermint creams and other sweets by adding flavouring, kneading in colouring, nuts, or crystallised fruits, or by dipping it in melted chocolate, as it is too sweet to use alone. The quantities given make about 2lb.

Chocolate fondant: Knead 2oz. of melted dark chocolate into 1 cup of fondant.

Fondant balls: Shape fondant into balls, and top each with an almond, half a walnut, a hazel nut, or a piece of crystallised fruit, or roll them in desiccated coconut, finely chopped nuts, or grated chocolate.

Cherry or nut bon-bons: Mould fondant into tiny balls and press them between halves of nuts or split crystallised cherries.

Fondant loaves: Add chopped fruit and nuts, pack the fondant into a loaf tin, let it stand until it is firm, and cut it into slices. Combinations often used are dates, figs, and nuts; dried apricots, raisins, and nuts; and crystallised cherries, almonds, and dates.

Peppermint creams: Knead in oil of peppermint a drop at a time, and pale-green colouring if desired. Roll the fondant out, cut it in rounds, and stand them overnight on waxed paper to harden.

Chocolate Fudge

2 cups of sugar
½ to 1 teaspoon of vanilla
½ to 1oz. of butter
¾ cup of milk
1 to 2oz. of plain dark chocolate

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Place all the ingredients but the vanilla and butter in a saucepan and heat them gently, stirring continuously, until the sugar and chocolate have dissolved and the mixture has boiled. Cook it for a moment or two with the lid on, then cook it uncovered and without stirring until a small amount forms a soft ball when dropped into cold water (238 degrees F.). Remove it from the heat, add the butter and vanilla, cool the mixture to 110 degrees, and beat it until it is creamy and thick. Tip it at once into a greased tin or plate and cut it into squares. These quantities make 25 to 30 pieces.

Cocoa fudge: Substitute 1 to 2oz. of cocoa for the chocolate and increase the butter to 1½oz. Mix the cocoa with the sugar before adding the milk.

Brown-sugar fudge: Substitute 2 cups of brown sugar for the white sugar.

Coconut fudge: Add ½ cup of shredded coconut just before beating.

Fruit fudge: Add ½ cup of raisins, cut figs, dates, or crystallised ginger just before beating.

Nut fudge: Add ½ cup of broken nuts just before beating.

Coconut Ice

2lb. of sugar
6oz. of desiccated coconut
½ to 1oz. of butter
½ teaspoon of vanilla
Pinch of cream of tartar

Dissolve the sugar and cream of tartar in ½ pint of water over gentle heat, stirring to prevent it burning. Heat the mixture until it boils, stop stirring, cook it with the lid on for a moment or two, uncover it, and boil it until the temperature is 238 to 240 degrees F. Add butter and vanilla, cool the mixture to 110 degrees, add the coconut, and beat it. When the sweet is thick and creamy pour half into a greased dish; tint the other half pale pink and pour it on top. Cut the sweet in squares when it is stiff. The quantities given make 32 to 36 pieces.

Fudge

1¾ cups of brown sugar, firmly packed
Pinch of salt
1 tablespoon of butter
½ cup of chopped nuts, dried fruits, or ginger
¾ cup of top milk
½ teaspoon of vanilla

Cook the fudge in the same way as chocolate fudge.

Caramels

2 cups of sugar
1 cup of sweetened condensed milk
1 cup of milk
2 teaspoons of vanilla
⅔ cup of maple syrup or honey
½ cup of cream
¼ cup of butter

Combine all the ingredients but the vanilla and cook them over gentle heat until the firm-ball stage is reached (245 degrees F.). Remove the mixture from the stove, add the vanilla, and pour it into a greased dish. When it is cold remove it from the dish, cut it with a sharp knife, and wrap the pieces in waxed paper. The yield from the quantities given is about 70 caramels.

Nut caramels: Add 1½ cups of chopped nuts after removing the mixture from the heat.

Coconut caramels: Add ¾ cup of desiccated or shredded coconut after cooking.

Fruit caramels: Add ¾ cup of chopped figs, dates, or raisins after cooking.

RECIPES FOR CHRISTMAS SWEETS

To prevent them from becoming too sticky toffees should be wrapped in waxed paper and then in cellophane.

Peanut Brittle

1 cup of sugar
¼ teaspoon of salt
½ cup of maple syrup, honey, or corn syrup
Small pinch of soda
1 cup of blanched peanuts
1 to 2 teaspoons of butter

Combine the sugar and syrup in a cup of water and stir until they are dissolved. Cook the mixture to about the soft-ball stage, add the blanched peanuts and salt, and cook it to the hard-crack stage (290 degrees F.), stirring continuously. Remove it from the heat, add the butter and soda, and pour the toffee on to well-greased enamel or tin plates. While it is cooling lift it up around the edges with a spatula or flexible knife to prevent it from sticking. As soon as it is firm enough turn it over and mark it. Break it into pieces when it is cold and wrap them in waxed paper if they are not to be used immediately.

Peanuts are blanched by standing them in boiling water for 2 to 3 minutes and then peeling them.

To make plain toffee omit the nuts.

Golden syrup may replace the honey, making a darker toffee.

Marshmallows

1oz. of gelatine
1lb. of sugar
1 teaspoon of vanilla
1½ cups of water
⅛ teaspoon of salt

Soak the gelatine in half the water. Place the sugar and salt in a saucepan with the rest of the water and heat them to 238 degrees F. Remove the syrup from the heat, pour it over the gelatine, and cool the mixture to 110 degrees (warm). Add flavouring and beat it with an egg whisk until it is thick and creamy. Pour it on to a plate that has had icing sugar sifted over it. Cool the sweet until it is set, turn it on to a board, cut it into pieces, and roll them in icing sugar, finely chopped nuts, or coconut. Add raisins or colour if desired.

Turkish Delight

2lb. of sugar
¼ teaspoon of citric acid
2oz. of gelatine
Colouring and flavouring

Soak the gelatine in 1¼ pints of water for 5 minutes, then add the sugar and stir the mixture over gentle heat until the sugar is dissolved. Boil it to the soft-ball stage (236 degrees F.), add the acid, colouring and flavouring essence, and pour it into wet moulds or plates. Let the sweet stand for 24 hours, cut it up, and toss each piece in icing sugar.

Recipes for Uncooked Sweets

Almond Paste for Marzipan

½lb. of ground almonds
1 egg or 2 egg whites
1lb. of icing sugar

Combine and stir the ingredients in a double boiler or basin over hot water until the mixture is very thick. Tip it out of the basin and knead it until it is pliable. Use it at once or roll it in waxed paper for use later. The use of egg whites instead of an egg makes the marzipan lighter in colour.

The paste may be used instead of fondant for date creams, nut creams, or cherry flowers (moulded round a crystallised cherry and pressed into four petals), or for moulding into fancy shapes of carrots, apples, and oranges, which can be suitably coloured and flavoured.

Mock Marzipan

1 tablespoon of golden syrup
2oz. of semolina
Almond essence

Heat the syrup in 5 tablespoons of water. Stir in the semolina and cook the mixture until it is thick (about 5 minutes). Remove it from the heat, flavour it, knead it well, and use it in the same ways as marzipan.

RECIPES FOR CHRISTMAS SWEETS

Sweets for a party. Left to right—Front row: Peanut brittle, rocky mountains, and fondant creams. Middle row: Marzipan fruits, peppermint creams, and marshmallows. Back row: Stuffed dates, nutty marshmallows, and fruit porcupines.

Rocky Mountains

Melt 1 or 2 4oz. bars of dark chocolate over hot water. Add a little condensed milk or water if necessary. Stir in ¼ to ½ cup of coarsely chopped nuts or dried fruits. Place the mixture in spoonfuls on waxed paper on a flat piece of cardboard or a bench to dry and harden. Sprinkle it immediately with coconut or icing sugar.

Unboiled Fondant

1lb. of icing sugar
1 teaspoon of lemon juice
1 egg white
½ teaspoon of cream of tartar

Roll and sift the icing sugar and add the lemon juice, cream of tartar, and egg white beaten with a fork. Mix them to form a paste that will shape in the hands, adding a little more icing sugar if required. Knead the paste well and leave it to stand for an hour before use; during this time it will become firmer. Before moulding the fondant roll it into little balls of even size in the hands. Use it for fondant almonds and other sweets and for filling date creams instead of using cooked fondant.

Fondant almonds: Add a few drops of almond flavouring and colour half the fondant pale green and half pale pink. Shape it into large mock almonds and press a blanched almond on top of each.

Peppermint creams: Add drops of peppermint oil to the fondant as required and colour it pale green. Roll it into even-sized balls, flatten them to the shape of thick pennies, and lay them on greaseproof paper to dry.

Fruit Porcupines

1 cup of desiccated coconut
¼ cup of finely chopped walnuts
1 cup of pitted dates
½lb. of dried figs
1 teaspoon of lemon juice

Mince the figs and dates and add the coconut and lemon juice. Knead the mixture and roll it into small balls. Roll them in finely chopped nuts until they are well coated.

This mixture can be used to fill dates or can be rolled in grated dark chocolate.

Norwegian Sugared Nuts

1lb. of shelled mixed nuts
¼ cup of butter
1 cup of sugar
2 teaspoons of butter
¼ teaspoon of cinnamon
2 egg whites
¼ teaspoon of salt

Heat the oven to 325 degrees F. Sprinkle the nuts and 2 teaspoons of butter on a shallow baking pan. Bake the nuts, stirring them frequently, for 25 minutes or until they are golden brown, then cool them. Melt the ¼ cup of butter in the pan, and beat the egg whites until they are stiff. Combine the sugar, salt, and cinnamon, fold them into the egg whites, and stir in the nuts. Spread the mixture over the melted butter in the baking pan and bake it at 325 degrees for 40 minutes. Cool it and break it into pieces.

Packing a Gift Box

With very little trouble sweets packed as a gift can be given a professional appearance. A cardboard box can be papered with decorative Christmas paper and lined with a border cut from lace-paper doilies or the tinsel paper used for wrapping Christmas cakes. Paper cups can be used to pack individual sweets, and strips of fine white cardboard to keep the rows separated.

Heavy or solid sweets should be used for the bottom layer of a deep box.

Toffees and caramels should always be wrapped in waxed paper, and then in cellophane if desired, to prevent them from becoming too sticky.

A selection of sweets of different types and shapes or the addition of marzipan fruits adds to the attractive appearance of a gift box of sweets and makes it worthy of a place on any Christmas tree.

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